STORMWATER MANAGEMENT REPORT

PRINCETON EXECUTIVE PARK

BLOCK 9, LOTS 12.01 & 12.02, BLOCK 9.03, LOTS 12.02
TOWNSHIP OF WEST WINDSOR, MERCER COUNTY, NJ

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I. INTRODUCTION

This report has been prepared to describe and document (through engineering calculations and related technical data) the stormwater management system design for the proposed mix-use development on block 9, lots 12.01 & 12.02 and block 9.03, lots 12.02 in the Township of West Windsor, New Jersey, consisting of 47+/- acres.

This report accompanies a set of plans prepared by Bowman Consulting Group, LTD, which illustrates the existing and proposed conditions upon the subject property, as well as provides details for the various stormwater management facilities described herein. Therefore, this report must be reviewed and considered in conjunction with these plans.

A. Location of Project Site

The development site is divided by Meadow Road. The northly portion of the site is bound by Meadow Road, Route 1 and onramp to the west, Carnegie Center Drive to the north and east. The southerly portion is bound by Meadow Road, Old Meadow Road and Wooded areas to the east.

Table No. 1 below summarizes the soil type and “Hydrologic Soil Group” for the soil type per the *Web Soil Survey*.

TABLE 1 SUMMARY OF ON-SITE SOILS		
Mapping Identification	**Soil Type**	**Hydrologic Soils Group (HSG)**
GafB	Galloway sandy loam 0-5% slopes	A

None of the soils listed in Table No. 1 above are classified as “acid producing soils,” nor is the project site located in an area of the State where acid producing soils are commonly encountered. Therefore, the on-site soils are not considered “acid-producing.”

B. Project Description

The proposed project consists of mixed-use residential apartment units, hotel site, and commercial and retail pad sites. Amenities such as two clubhouses and active/passive recreational facilities are also proposed.

Stormwater discharges towards the wooded wetlands areas to the east / southeast of the site, downstream of the existing detention pond that was previously constructed for a prior development that never got constructed.

In addition to the existing detention wet pond, four (4) additional stormwater management basins are proposed to facilitate development phasing and to spread groundwater recharge throughout the site. Basin 1 is an extended detention basin with a sand bottom strip to facilitate groundwater recharge. Basins 2, 3, and 4 also have sand bottoms and facilitate in spreading groundwater recharge across the development site. And the existing wet pond to the south east corner of the development site provides additional detention to meet post development discharge reduction requirements as well as achieving water quality prior to discharge.

II. OVERVIEW OF REGULATORY REQUIREMENTS

The storm water management system for the proposed project will be designed to comply with current regulatory requirements and standards. The applicable regulations and standards are as follows:

- The State of New Jersey's *"Stormwater Management Rules*", as set forth at NJAC 7:8

- Residential Site Improvement Standards, NJAC 5:21

- The Stormwater Management requirements of the County and Township

- The "*Standards for Soil Erosion and Sediment Control in New Jersey*"

Compliance with each of the above-referenced standards necessitates the preparation of a storm water management plan and design that addresses multiple considerations with respect to controlling and managing post-development storm water runoff. These considerations are as follows:

- Use of Non-Structural Strategies to the maximum extent practicable
- Maintenance of average annual groundwater recharge volume
- Compliance with applicable Water Quality Management Standards
- "Quantity Control," achieved through peak flow attenuation
- Minimization of erosion and sedimentation
- Providing an effective collection and conveyance system
- Assuring effective operation and perpetual maintenance for the system

The remainder of this report will detail the manner in which the project's stormwater management design will address each of the above considerations, except for the requirement relevant to maintenance. The maintenance requirements are to be addressed in a separate Operations and Maintenance document.

The Appendices of this report contain engineering calculations and related technical documentation supporting the project's design as described herein.

III. METHODOLOGIES

This section of this report describes the engineering methodologies employed for the design of the project's storm water management system. All of the methods are specifically referenced in the applicable regulations and/or in one or more of the "References" listed in Section VIII of this report. Most of the methods are specified and/or detailed in *The New Jersey Stormwater Best Management Practices Manual*, hereinafter referred to as "the BMP Manual." Specifically, the various methods used in the preparation of the project's plans and stormwater management design to address each of the multiple considerations described above were as follows:

A. Estimates of Runoff Rates and Volumes

1. Pre-Development versus Post-Development

The hydrologic estimates and modeling conducted for the design of project's storm water management system utilized the "NRCS Methodology" which is specifically referenced for such applications in the BMP Manual. This method is also commonly known as the "TR-55 Method." Storm frequencies of 2, 10 and 100-years were modeled, as required to demonstrate compliance with the "quantity control" provisions of the subject Rules. The models were created using the SCS Type III, 24-hour rainfall distribution with the Standard unit hydrograph, also consistent with the guidance provided in the BMP Manual. According to data published by the State Office of the Natural Resources Conservation Service (copy provided in **Appendix No. 1**), the 24-hour rainfall depths for the County's storm frequencies modeled are as follows:

- 2-year = 3.31 inches
- 10-year = 5.01 inches
- 100-year = 8.33 inches

2. Runoff Curve Numbers and Times of Concentration

As indicated in Subsection I-A of this report, the soils within the project site have been determined to be categorized within "Hydrologic Soil Group" A (HSG-A) based upon the geotechnical subsurface investigation. Copies of relevant information obtained from the above referenced soil survey and various Soil Conservation Service (SCS) technical publications pertaining to the soils mapping and HSG determination(s) are provided in **Appendix No. 1** of this report. Accordingly, the following CN values have been employed for the various existing and proposed combinations of soil types and land cover:

Impervious Surface	98
Crop Rows (C&T)	62
Wooded Areas (w/ grass)	32
Open Space	39

Appendix No. 1 also contains documentation from SCS publications relevant to the above values.

In addition to CN values, the above referenced NRCS Methodology for estimating stormwater runoff rates and volumes also necessitates the determination of a time of concentration for each subwatershed/drainage area. The times of concentration were estimated in accordance with the criteria given in the SCS 1986 TR-55 publication using 6 minute (0.10 hour) minimum Tc.

3. Weighted Average Volume Technique

Under proposed conditions, several of the subwatershed areas considered in the analyses include a significant quantity of “directly connected” impervious surfaces. As stated in the BMP Manual, due to the non-linear character of the runoff equations inherent in the TR-55 methodology, variations in cover conditions are not always accurately reflected by calculating a weighted average CN value for the entire subwatershed. Rather, a procedure termed the “weighted average volume technique” was presented and recommended in the BMP Manual for such subwatershed areas. Many of the post-development subwatershed areas considered in the design of the project’s stormwater management system utilized the weighted average volume technique. In such cases, two hydrographs (one representing the directly connected impervious acreage within the area and the other representing the remaining acreage) were developed for the subwatershed. The hydrograph representing the impervious area was given the suffix “IMP” for identification. The hydrograph representing the remainder of the area was assigned the suffix “PERV”. Section V of this report identifies the subwatershed areas considered on a weighted average volume basis.

4. Collection and Conveyance System Design

The project’s collection and conveyance system design is based upon a 25-year storm event. The proposed storm sewer system has also been analyzed under 100-year conditions to ensure runoff from larger storms will be collected and attenuated by the proposed stormwater management basins. In no case does the 100-year hydraulic grade line exceed a catch basin’s grate elevation which would result in a flooded condition.

B. Water Quality Management

The project’s Water Quality Management design will be based upon a 1.25-inch rainfall, having a two-hour distribution as specified on Figure 5-2 of the BMP Manual.

As described in detail in Section V below, compliance with the regulatory requirement for removing total suspended solids (TSS) from the post-project runoff will be achieved through the existing wet pond having a greater than 3:1 permanent pool to water quality storm runoff volume ratio to achieve the 80% TSS removal rate required for the project. The four (4) additional basins proposed for the project will also provide additional water quality through additional attenuation and groundwater recharge infiltration.

IV. EXISTING SITE CONDITIONS AND STORMWATER RUNOFF ESTIMATES

The following is a description of the Drainage Areas (DA) and Analysis Points (AP) depicted on the accompanying drainage area maps in order to evaluate the change existing and proposed conditions.

Existing Drainage Area to Analysis Point 1

The development area, approximately 47 acres, drains to the east/southeast to the wooded wetland area downstream of the existing detention basin.

A summary of the Existing Weighted CN number and time of concentration is

TABLE 2

EX. Drainage Area	Area (Ac.)	Weighted CN	Tc (hour)
X-1 perv	44.9	59	1.0
X-2 imp	2.1	98	0.1

The path used to estimate the time of concentration for the watershed is also illustrated on the subject Drainage Area Map. The calculations for the time of concentration, weighted CN value and peak runoff rates for the areas under existing conditions are provided in **Appendix No. 2.**

The peak rates of runoff for each of the storms studied are summarized in Table No. 3 below.

TABLE 3		
SUMMARY OF EXISTING PEAK RUNOFF RATES		
Analysis Point	**Storm Frequency (Years)**	**Peak Rate of Runoff (cfs)**
AP-1	2	6.15
	10	23.17
	100	71.21

V. DESCRIPTION OF PROPOSED CONDITIONS

The following is a description of the Drainage Areas (DA) and Analysis Points (AP) depicted on the accompanying drainage area maps.

Proposed Drainage Area P-1

Approximately 27.3 acres of the proposed impervious cover and 19.7 acres of open space will be collected by the proposed on-site storm sewer system and directed to one of the four proposed basins or the existing pond for attenuation and water quality treatment.

A summary of the Proposed CN number and time of concentration is:

TABLE 4

Proposed Drainage Area	Area (Ac.)	CN	Tc (hour)
P1-IMP	9.3	98	0.1
P1-PERV	3.9	39	0.1
P2-IMP	4.5	98	0.1
P2-PERV	2.7	39	0.1
P3-IMP	2.1	98	0.1
P3-PERV	1.5	39	0.1
P4-IMP	5.9	98	0.1
P4-PERV	2.2	39	0.1
P5-IMP	4.7	98	0.1
P5-PERV	3.8	39	0.1
P-UC1	3.2	50	0.1
P-UC2	1.4	69	0.1
P-UC3	1.8	59	0.1

Water Quality Treatment

As required by the State's Stormwater Management Rules, eighty percent (80%) removal of total suspended solids (TSS) from the project's runoff during the water quality design storm is required. This will be achieved through the existing wet pond having a 7.0+/- ac*ft. permanent pool volume (1.8 normal water surface area x 4'+/- depth) with 0.938 ac*ft water quality storm runoff volume (see return event 1 aka water quality design storm inflow volume for Basin Ex) resulting in a 7.46:1 ratio exceeding the 3:1 requirement for 80% TSS removal. In addition, the proposed four (4) additional basin proposed will provide additional water quality though infiltration and extended attenuation.

VI. COMPLIANCE WITH STORMWATER MANAGEMENT RULES

This section of this report is intended to demonstrate that the stormwater management system designed for the project, as above described, is compliant with all of the regulatory requirements pursuant to the applicable Rules. The various considerations relevant to the design of the system were listed in Section II of this report. To reiterate, these considerations are as follows:

- Use of Non-Structural Strategies to the maximum extent practicable
- Maintenance of average annual groundwater recharge volume
- Compliance with applicable Water Quality Management Standards
- "Quantity Control," achieved through peak flow attenuation
- Providing an effective collection and conveyance system
- Assuring minimization of erosion and sedimentation
- Providing for proper maintenance of the system

Except for the requirement relevant to the maintenance of the proposed system, this section of this report will address each of the above considerations with respect to complying with the applicable rules and standards. As indicated above, the requirement relevant to system maintenance will be addressed in a separate report.

1. Use of Non-Structural Strategies

In accordance with N.J.A.C. 7:8-5.3 Nonstructural Stormwater Management Strategies, each design shall to the maximum extent possible incorporate nonstructural stormwater strategies to meet the stormwater runoff quantity, quality, and groundwater recharge requirements of the Stormwater Management Regulations. In order to determine if the proposed nonstructural strategies are sufficient for a development, the nine nonstructural strategies identified in both N.J.A.C. 7:8-5.3 and the New Jersey Stormwater Best Management Practices Manual are to be addressed. The nine strategies are identified below with a discussion of how each strategy has been incorporated into the proposed design.

1. *Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.*

Areas previously disturbed by the farming activity will be re-vegetated. Mature treed areas of the site will be preserved to the extent practical to facilitate the development.

2. *Minimize Impervious Surfaces and break up or disconnect the flow of runoff over impervious surfaces.*

Impervious surfaces will be minimized to the extent practical for this type of development. Where possible, grassed areas will be used for stormwater conveyance to the on-site stormwater facilities. This enhances water quality, promotes groundwater recharge and increases time of concentration ultimately reducing runoff from the project.

3. *Maximize the protection of natural drainage features and vegetation.*

Previously disturbed portions of the site will be replanted. Mature treed areas on site will remain undisturbed. Stormwater will be directed way from steeper slope areas where there is an increased potential for erosion.

4. *Minimize the decrease in the pre-construction "time of concentration."*

The proposed detention basins will over detain stormwater pursuant to the drainage deficiencies downstream. This will decrease the pre-construction time of concentration to the maximum extent practical. It also enhances water quality and promotes groundwater recharge for the project.

5. *Minimize land disturbance including clearing and grading.*

All land disturbances will primarily be limited to the previously disturbed portions of the site from the prior farming activity. Existing slope and contour of the property was maintained to the maximum extent practical to reduce the grading required.

6. *Minimize soil compaction.*

Soil compaction will be minimized to the extent practical for this project. No excessive soil compaction is proposed. It is understood that soil compaction is required for areas of proposed structures consisting of roadways, buildings, driveways and sidewalks. The construction of the basin bottom is to be performed using lightweight compaction equipment to promote the infiltration and recharge of stormwater into the on-site soils.

7. *Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.*

Plantings are low maintenance species. The amount of lawn space has been limited as much as possible which will reduce fertilizer and pesticide use on the site.

8. *Provided vegetated open-channel conveyance systems discharging into and through stable vegetated areas.*

The construction of vegetated open-channel conveyance systems will be provided to the maximum extent practical. The use of vegetated open-channel conveyance systems however is limited due to the requirement of installing curbs and sidewalks.

9. *Provide other preventative source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the*

release of those pollutants into stormwater runoff. These source controls include, but are not limited to:

a. Site design features that help to prevent the accumulation of trash and debris in drainage systems;

b. Site design features that help prevent discharge of trash and debris from drainage systems;

c. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

d. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

The stormwater management facilities proposed will result in the removal of 80% total suspended solids for the stormwater runoff discharge from the site.

Preventative source controls provided include NJPDES Phase II inlet curb pieces proposed to be installed on all Type B inlets. The curb piece proposed is a Type “J-eco” curb piece as manufactured by Campbell Foundry. This curb piece will prevent trash and debris from entering the storm drainage system.

Within the onsite basins, conduit outlet protection will be provided to capture trash and debris that does discharge into the inlets and is conveyed to the basins. The basins are designed with a sand bottom where applicable to aid in the maintenance of the facility and the removal of any accumulated trash and debris.

The site requires approval from the Soil Conservation District for Soil Erosion and Sediment Control Plan Certification. Upon disturbance of the land, the site shall be vegetated in accordance with the Soil Erosion Standards of New Jersey and the approved Soil Erosion and Sediment Control Plan for the project. In addition, the site will disturb greater than one acre and require a 5G3 Construction Activity Stormwater (GP) NJPDES permit and the preparation of a Stormwater Pollution Prevention Plan (SWPPP) for the project.

The proposed design of the site has incorporated to the maximum extent possible nonstructural stormwater strategies on-site and therefore meets the intent of the regulation.

2. <u>Maintenance of Average Annual Groundwater Recharge</u>

The soils encountered on site are classified Hydrologic Soils Group A (HSG-A) and are highly suitable for groundwater recharge. Per the GSR-32 spreadsheet, the post-development annual recharge deficit is 1,274,937 cubic feet for the post-development site conditions as compared to existing conditions. As a result, four (4) basins are provided with sand bottoms to facilitate infiltration in order to achieve or exceed the groundwater recharge deficit. The following is a summary of the annual BMP recharge volumes provided by each proposed recharge basin:

Basin	Recharge Volume (cf)
1	617,996
2	379,553
3	186,565
4	314,765
Total	1,498,879

As a result, the post-development conditions will provide approximately 30% more groundwater recharge than required based on pre-developed conditions maximizing on site recharge as much as practical. Also, in accordance with the BMP rules, each recharge basin is sized so it will fully drain within 72 hours and the bottom of the 6” thick sand filter layer is at least 2’ above seasonal high groundwater.

3. Water Quality Management

As previously stated, the regulatory requirement for removing total suspended solids (TSS) from the post-project runoff will be achieved through the existing wet pond with greater than 3:1 permanent pool to water quality storm runoff volume to achieve the 80% TSS removal rate required for the project. The four (4) additional basin upstream of the existing pond will provide additional pretreatment though extended attenuation and infiltration.

4. Quantity Control (Peak Flow Attenuation)

The project’s approach for compliance with the regulatory requirements for “quantity control” are set forth at Subpart 5.4(a)(3)(iii) of the Stormwater Management Regulations (NJAC 7:8). Stormwater management facilities have been designed to provide for the temporary storage of stormwater to attenuate post-project construction peak runoff rates for the 2, 10 and 100-year storm events. As explained in detail below, the stormwater management facilities provide sufficient attenuation to reduce the peak rates of runoff from the developed portion of the project tract by (at least) a reduction factor of 50% for the 2-year storm, 75% for the 10-year storm and 80% for the 100-year storm pursuant to the specific requirements of Subpart 5.4(a)(3)(iii) and without infiltration.

TABLE 7 SUMMARY OF PEAK RUNOFF RATES at ANALYSIS POINT 1				
Storm Frequency (yrs)	Existing Peak Rate (cfs)	Reduction Factor	Allowable Peak Rate (cfs)	Proposed Peak Rate (cfs)
2	6.15	50%	3.08	1.65
10	23.17	75%	17.37	6.63
100	71.21	80%	56.96	21.06

The TR55 calculations for post-project conditions are provided in **Appendix No. 3.** The following table identifies the performance summaries of the detention basin:

Table 8.1 Performance Summary of Basin 1				
Storm Freq. (yrs)	Peak Inflow (cfs)	Peak Outflow (cfs)	Maximum Storage Peak	
			Volume (ac-ft)	Elevation (ft)
2	22.49	2.42	1.59	72.24
10	34.29	8.23	2.21	72.87
100	60.93	34.26	2.97	73.59

Table 8.2 Performance Summary of Basin 2				
Storm Freq. (yrs)	Peak Inflow (cfs)	Peak Outflow (cfs)	Maximum Storage Peak	
			Volume (ac-ft)	Elevation (ft)
2	10.88	10.25	0.36	69.59
10	16.59	14.82	0.40	69.76
100	30.25	26.29	0.49	70.22

Table 8.3				
Performance Summary of Basin 3				
Storm Freq. (yrs)	Peak Inflow (cfs)	Peak Outflow (cfs)	Maximum Storage Peak	
			Volume (ac-ft)	Elevation (ft)
2	5.08	4.40	0.19	69.50
10	7.74	6.87	0.20	69.67
100	14.35	12.88	0.24	70.03

Table 8.4				
Performance Summary of Basin 4				
Storm Freq. (yrs)	Peak Inflow (cfs)	Peak Outflow (cfs)	Maximum Storage Peak	
			Volume (ac-ft)	Elevation (ft)
2	14.27	12.90	0.25	68.28
10	21.75	20.20	0.29	68.59
100	38.40	36.96	0.33	68.93

Table 8.5				
Performance Summary of Existing Wet Pond				
Storm Freq. (yrs)	Peak Inflow (cfs)	Peak Outflow (cfs)	Maximum Storage Peak	
			Volume (ac-ft)	Elevation (ft)
2	37.32	0.54	4.487	67.18
10	61.24	0.93	8.182	68.86
100	129.73	15.80	10.697	69.95

5. Soil Erosion and Sediment Control Compliance

The project has been designed to minimize erosion and sedimentation in accordance with *The Standards for Soil Erosion and Sediment Control in New Jersey*" "Soil Erosion and Sediment Control Plan" is included in the set of project plans, specifying numerous practices to achieve this goal. The project's "Soil

Erosion and Sediment Control Plan" is subject to review and approval by the County Soil Conservation District. The District's certification of the plan is required before any construction may commence, which provides further assurance that the project's implementation will minimize erosion and sedimentation.

In addition to the above referenced construction practice, the project's stormwater management system has also been designed consistent with the subject standards. In particular, the stormwater management system has been designed compliant with the standards for off-site stability per the information provided in Tables 7 and 8.

6. Collection and Conveyance System Design

The project's storm water management system includes a network of storm sewer pipes to convey the stormwater runoff to and from the various management facilities. Similarly, stormwater inlets are strategically located to collect runoff from the surface of the ground. The collection and conveyance system are designed for the peak rate of runoff during a 25-year storm. The system was also analyzed under 100-yr storm conditions which result in non-flooding conditions for pipe sections that exceeded gravity flow capacity. Calculations are provided in **Appendix No. 1**

VII. Summary and Conclusions

This report has described the design of the stormwater management system proposed for the project, as illustrated on the project's Site Plans. The stormwater facilities proposed will comply with quantity control requirements of reducing the peak rate by 50% for the 2-year storm, 75% for the 10-year storm and 80% for the 100-year storm for at Analysis Points. Water Quality treatment of stormwater runoff from the project results in greater than 80% TSS removal.

This report also identified the regulatory requirements pertaining to the system's design and, as supported by the engineering calculations and related technical data contained in the appendices of this report, documenting the system's compliance with the regulatory requirements.

As a result, the project will have minimal impacts to the surrounding areas.

VIII. REFERENCES

The following documents were relied upon during the preparation of the project's stormwater management plan:

1. New Jersey Stormwater Best Management Practices Manual, New Jersey Department of Environmental Protection; April 2004 (Revised November, 2009).

2. Residential Site Improvement Standards, New Jersey Administrative Code Title 5, Chapter 21; Adopted January 6, 1997; Revised June 4, 2007.

3. Standards for Soil Erosion and Sediment Control in New Jersey, New Jersey State Soil Conservation Committee; Adopted July 1999.

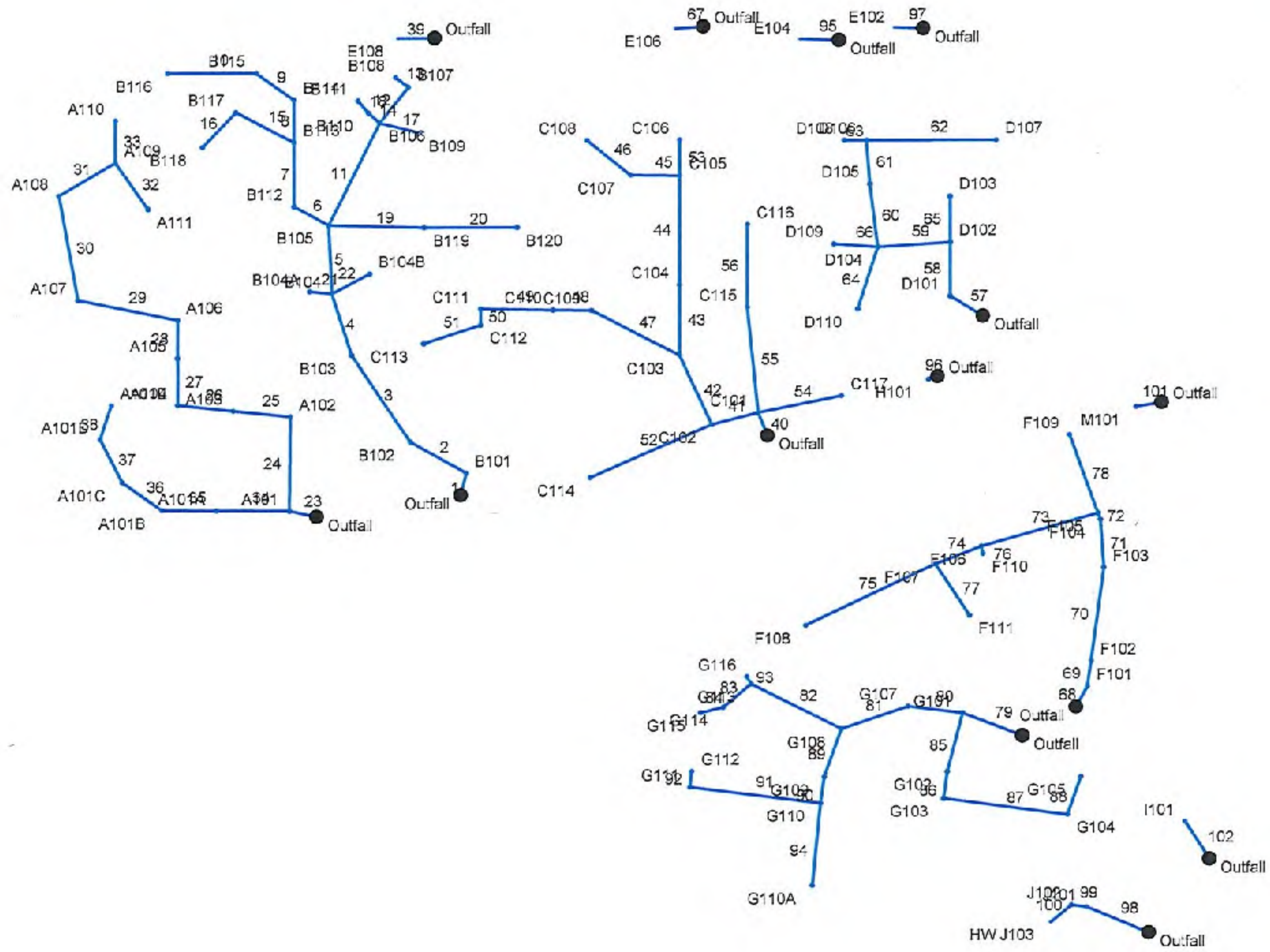
4. Urban Hydrology for Small Watersheds, United States Department of Agriculture, Soil Conservation Service; June 1986.

5. Soil Survey of Somerset County, United States Department of Agriculture, Soil Conservation Service, December 1976.

APPENDIX NO. 1
GENERAL DESIGN INFORMATION

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan

25-YR



Project File: master pipe network - 01-15-20.stm	Number of lines: 102	Date: 1/14/2020

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	35.000	0.32	5.57	0.90	0.29	5.01	10.0	19.4	4.9	24.32	29.91	5.36	36	0.17	70.00	70.06	71.81	71.92	72.86	74.00	B101-100
2	1	98.092	0.39	5.25	0.90	0.35	4.72	10.0	19.0	4.9	23.19	33.43	4.13	36	0.21	70.06	70.27	72.34	72.44	74.00	74.00	B102-101
3	2	161.000	0.00	4.86	0.90	0.00	4.37	10.0	18.2	5.0	21.91	31.19	3.89	36	0.19	70.27	70.57	72.58	72.73	74.00	75.30	B103-102
4	3	100.451	0.30	4.86	0.90	0.27	4.37	10.0	17.7	5.1	22.19	32.24	4.02	36	0.20	70.57	70.77	72.81	72.91	75.30	74.60	B104-103
5	4	106.221	0.21	3.88	0.90	0.19	3.49	10.0	17.3	5.1	17.92	26.22	3.85	30	0.35	70.77	71.14	73.17	73.29	74.60	74.50	B105-104
6	5	60.415	0.47	1.44	0.90	0.42	1.30	10.0	16.9	5.2	6.73	14.45	2.14	24	0.35	71.14	71.35	73.54	73.58	74.50	74.70	B112-105
7	6	99.113	0.12	0.97	0.90	0.11	0.87	10.0	16.0	5.3	4.66	14.56	1.49	24	0.35	71.35	71.70	73.65	73.68	74.70	75.00	B113-112
8	7	65.836	0.13	0.38	0.90	0.12	0.34	10.0	15.3	5.4	1.86	4.95	1.52	15	0.50	72.00	72.33	73.71	73.76	75.00	75.00	B114-113
9	8	71.501	0.14	0.25	0.90	0.13	0.23	10.0	14.3	5.6	1.26	4.96	1.06	15	0.50	72.33	72.69	73.79	73.81	75.00	75.50	B115-114
10	9	135.000	0.11	0.11	0.90	0.10	0.10	10.0	10.0	6.5	0.64	3.35	0.65	15	0.23	72.69	73.00	73.82	73.83	75.50	75.50	B116-115
11	5	176.078	0.15	1.13	0.90	0.14	1.02	10.0	14.9	5.5	5.60	15.45	1.84	24	0.40	71.14	71.84	73.54	73.62	74.50	74.60	B106-105
12	11	70.688	0.06	0.11	0.90	0.05	0.10	10.0	11.7	6.1	0.61	6.77	0.34	18	0.35	71.84	72.09	73.67	73.67	74.60	74.70	B107-106
13	12	24.252	0.05	0.05	0.90	0.05	0.05	10.0	10.0	6.5	0.29	4.92	0.24	15	0.49	72.09	72.21	73.67	73.68	74.70	74.70	B108-107
14	11	23.590	0.17	0.40	0.90	0.15	0.36	10.0	10.4	6.4	2.31	6.20	1.31	18	0.30	71.84	71.91	73.67	73.68	74.60	74.60	B110-106
15	7	100.446	0.29	0.47	0.90	0.26	0.42	10.0	10.9	6.3	2.66	4.58	2.17	15	0.43	71.70	72.13	73.71	73.86	75.00	75.00	B117-113
16	15	74.134	0.18	0.18	0.90	0.16	0.16	10.0	10.0	6.5	1.05	2.73	1.34	12	0.50	72.13	72.50	73.93	73.98	75.00	74.50	B118-117
17	11	63.118	0.47	0.47	0.90	0.42	0.42	10.0	10.0	6.5	2.75	8.10	1.56	18	0.51	71.84	72.16	73.67	73.71	74.60	74.40	B109-106
18	14	24.398	0.23	0.23	0.90	0.21	0.21	10.0	10.0	6.5	1.35	4.25	1.10	15	0.37	71.91	72.00	73.69	73.69	74.60	74.60	B111-110
19	5	145.738	0.46	1.10	0.90	0.41	0.99	10.0	10.8	6.3	6.25	12.18	1.99	24	0.25	71.14	71.50	73.54	73.63	74.50	74.30	B119-105
20	19	142.000	0.64	0.64	0.90	0.58	0.58	10.0	10.0	6.5	3.74	4.15	3.05	15	0.35	71.50	72.00	73.64	74.05	74.30	74.00	B120-119
21	4	34.000	0.37	0.37	0.90	0.33	0.33	10.0	10.0	6.5	2.16	3.79	1.76	15	0.29	71.15	71.25	73.17	73.20	74.60	74.50	B104A-104

Project File: master pipe network - 01-15-20.stm

Number of lines: 102

Run Date: 1/14/2020

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
22	4	65.121	0.31	0.31	0.90	0.28	0.28	10.0	10.0	6.5	1.81	4.16	1.48	15	0.35	70.77	71.00	73.17	73.21	74.60	74.00	B104B-104
23	End	42.891	0.00	5.10	0.90	0.00	4.59	10.0	16.4	5.3	24.17	33.10	5.49	36	0.21	70.00	70.09	71.77	71.90	73.30	76.00	A101-100
24	23	145.752	0.40	3.98	0.90	0.36	3.58	10.0	15.8	5.4	19.20	19.82	4.15	30	0.20	70.09	70.38	72.35	72.58	76.00	74.00	A102-101
25	24	87.977	0.15	3.58	0.90	0.14	3.22	10.0	15.4	5.4	17.47	20.10	3.58	30	0.20	70.38	70.56	72.85	72.97	74.00	74.00	A103-102
26	25	85.434	0.19	3.43	0.90	0.17	3.09	10.0	15.0	5.5	16.94	17.99	3.48	30	0.16	70.56	70.70	73.00	73.11	74.00	74.00	A104-103
27	26	71.866	0.39	3.24	0.90	0.35	2.92	10.0	14.7	5.5	16.18	20.30	3.30	30	0.21	70.70	70.85	73.30	73.35	74.00	74.20	A105-104
28	27	59.454	0.80	2.85	0.90	0.72	2.57	10.0	14.4	5.6	14.37	18.22	2.93	30	0.17	70.85	70.95	73.38	73.43	74.20	74.25	A106-105
29	28	155.921	0.62	2.05	0.90	0.56	1.85	10.0	13.2	5.8	10.72	17.06	2.19	30	0.15	70.95	71.18	73.57	73.65	74.25	74.80	A107-106
30	29	164.237	0.23	1.43	0.90	0.21	1.29	10.0	12.2	6.0	7.75	12.24	2.47	24	0.25	71.18	71.59	73.72	73.89	74.80	76.00	A108-107
31	30	100.368	0.59	1.20	0.90	0.53	1.08	10.0	11.4	6.2	6.67	12.23	2.12	24	0.25	71.59	71.84	73.98	74.05	76.00	75.00	A109-108
32	31	87.694	0.14	0.14	0.90	0.13	0.13	10.0	10.0	6.5	0.82	2.73	1.04	12	0.50	72.56	73.00	74.12	74.16	75.00	75.00	A111-109
33	31	64.751	0.47	0.47	0.90	0.42	0.42	10.0	10.0	6.5	2.75	4.92	2.24	15	0.49	72.18	72.50	74.12	74.22	75.00	75.00	A110-109
34	23	111.858	0.18	1.12	0.90	0.16	1.01	10.0	13.1	5.8	5.89	10.87	1.87	24	0.20	70.09	70.31	72.35	72.41	76.00	73.70	A101A-100
35	34	82.742	0.28	0.94	0.90	0.25	0.85	10.0	12.2	6.0	5.08	11.11	1.62	24	0.21	70.31	70.48	72.42	72.46	73.70	74.00	A101B-101A
36	35	74.838	0.00	0.66	0.90	0.00	0.59	10.0	11.7	6.1	3.64	8.00	2.06	18	0.49	70.48	70.85	72.48	72.56	74.00	74.00	A101C-101B
37	36	74.628	0.48	0.66	0.90	0.43	0.59	10.0	11.1	6.2	3.71	5.10	2.10	18	0.20	70.85	71.00	72.59	72.67	74.00	74.00	A101D-101C
38	37	55.573	0.18	0.18	0.90	0.16	0.16	10.0	10.0	6.5	1.05	4.97	0.86	15	0.50	71.00	71.28	72.72	72.74	74.00	74.00	A101E-101D
39	End	56.718	0.91	0.91	0.60	0.55	0.55	10.0	10.0	6.5	3.55	6.57	4.08	15	0.88	70.50	71.00	71.43	71.76	72.00	73.00	E108-107
40	End	38.596	0.34	6.15	0.90	0.31	5.54	10.0	13.5	5.8	31.92	43.52	6.38	36	0.36	67.00	67.14	69.03	69.11	68.44	72.10	C101-100
41	40	72.836	0.00	4.55	0.90	0.00	4.10	10.0	13.1	5.8	23.89	42.33	3.78	36	0.34	67.14	67.39	69.76	69.81	72.10	73.10	C102-101
42	41	116.889	0.32	3.96	0.90	0.29	3.56	10.0	12.5	6.0	21.24	42.79	3.43	36	0.35	67.39	67.80	70.04	70.10	73.10	72.60	C103-102

Project File: master pipe network - 01-15-20.stm | Number of lines: 102 | Run Date: 1/14/2020

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station Line	Station To Line	Len (ft)	Drng Area Incr (ac)	Drng Area Total (ac)	Rnoff coeff (C)	Area x C Incr	Area x C Total	Tc Inlet (min)	Tc Syst (min)	Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe Size (in)	Pipe Slope (%)	Invert Elev Dn (ft)	Invert Elev Up (ft)	HGL Elev Dn (ft)	HGL Elev Up (ft)	Grnd / Rim Elev Dn (ft)	Grnd / Rim Elev Up (ft)	Line ID
43	42	109.868	0.37	1.84	0.90	0.33	1.66	10.0	11.8	6.1	10.10	14.41	3.40	24	0.35	68.30	68.68	70.24	70.37	72.60	72.60	C104-103
44	43	169.102	0.33	1.47	0.90	0.30	1.32	10.0	11.2	6.2	8.24	8.39	4.87	18	0.54	68.93	69.85	70.40	71.15	72.60	72.60	C105-104
45	44	75.002	0.25	0.64	0.90	0.23	0.58	10.0	10.8	6.3	3.64	4.98	2.97	15	0.51	70.10	70.48	71.55	71.73	72.60	74.00	C107-105
46	45	85.920	0.39	0.39	0.90	0.35	0.35	10.0	10.0	6.5	2.28	4.95	2.03	15	0.50	70.48	70.91	71.82	71.90	74.00	74.60	C108-107
47	42	152.180	0.73	1.80	0.90	0.66	1.62	10.0	11.7	6.1	9.92	14.46	3.16	24	0.35	67.80	68.33	70.24	70.49	72.60	73.40	C109-103
48	47	58.965	0.20	1.07	0.90	0.18	0.96	10.0	11.4	6.2	5.96	7.98	3.37	18	0.49	68.58	68.87	70.56	70.73	73.40	73.50	C110-109
49	48	110.785	0.16	0.87	0.90	0.14	0.78	10.0	10.7	6.3	4.96	8.02	4.67	18	0.50	69.87	70.42	70.75	71.28	73.50	74.50	C111-110
50	49	24.656	0.36	0.71	0.90	0.32	0.64	10.0	10.6	6.4	4.06	4.88	4.45	15	0.49	70.42	70.54	71.29	71.41	74.50	74.50	C112-111
51	50	91.867	0.35	0.35	0.90	0.32	0.32	10.0	10.0	6.5	2.05	2.73	2.64	12	0.50	70.54	71.00	71.71	71.94	74.50	74.00	C113-112
52	41	203.000	0.59	0.59	0.90	0.53	0.53	10.0	10.0	6.5	3.45	4.73	3.13	15	0.46	68.64	69.57	70.04	70.52	73.10	73.10	C114-102
53	44	55.132	0.50	0.50	0.90	0.45	0.45	10.0	10.0	6.5	2.92	4.99	2.38	15	0.51	69.22	69.50	71.55	71.65	72.60	72.90	C106-105
54	40	129.970	0.18	0.18	0.90	0.16	0.16	10.0	10.0	6.5	1.05	4.91	1.07	15	0.49	68.36	69.00	69.76	69.79	72.10	71.50	C117-101
55	40	163.863	0.46	1.08	0.90	0.41	0.97	10.0	10.7	6.3	6.15	8.05	3.48	18	0.50	67.69	68.51	69.76	70.24	72.10	72.00	C115-101
56	55	127.964	0.62	0.62	0.90	0.56	0.56	10.0	10.0	6.5	3.63	4.95	2.95	15	0.50	68.51	69.15	70.27	70.62	72.00	72.40	C116-115
57	End	59.114	0.37	2.83	0.90	0.33	2.55	10.0	13.8	5.7	14.55	26.48	5.27	30	0.36	67.00	67.21	68.43	68.53	69.80	71.40	D101-100
58	57	83.390	0.00	2.46	0.90	0.00	2.21	10.0	13.2	5.8	12.86	26.20	3.87	30	0.35	67.21	67.50	68.94	69.00	71.40	72.50	D102-101
59	58	110.817	0.17	2.03	0.90	0.15	1.83	10.0	12.7	5.9	10.80	16.46	4.13	24	0.45	67.50	68.00	69.27	69.40	72.50	71.25	D104-102
60	59	98.288	0.42	1.33	0.90	0.38	1.20	10.0	12.3	6.0	7.17	7.61	4.06	18	0.45	68.00	68.44	69.73	70.12	71.25	71.50	D105-104
61	60	67.873	0.26	0.91	0.90	0.23	0.82	10.0	11.9	6.1	4.97	7.81	2.81	18	0.47	68.44	68.76	70.16	70.26	71.50	72.20	D106-105
62	61	197.932	0.36	0.36	0.90	0.32	0.32	10.0	10.0	6.5	2.11	4.95	2.08	15	0.50	68.76	69.75	70.38	70.57	72.20	72.00	D107-106
63	61	34.000	0.29	0.29	0.90	0.26	0.26	10.0	10.0	6.5	1.70	4.95	1.38	15	0.50	68.76	68.93	70.38	70.40	72.20	72.00	D108-106

Project File: master pipe network - 01-15-20.stm

Number of lines: 102

Run Date: 1/14/2020

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
64	59	100.940	0.36	0.36	0.90	0.32	0.32	10.0	10.0	6.5	2.11	2.72	2.68	12	0.50	68.00	68.50	69.73	70.03	71.25	71.00	D110-104
65	58	71.506	0.43	0.43	0.90	0.39	0.39	10.0	10.0	6.5	2.51	4.96	2.24	15	0.50	68.00	68.36	69.27	69.34	72.50	71.40	D103-102
66	59	67.076	0.17	0.17	0.90	0.15	0.15	10.0	10.0	6.5	0.99	2.75	1.27	12	0.51	68.00	68.34	69.73	69.77	71.25	71.50	D109-104
67	End	42.165	1.16	1.16	0.60	0.70	0.70	10.0	10.0	6.5	8.07	12.67	3.87	19 x 30 e	0.28	68.40	68.52	69.48	69.53	70.40	70.52	E106-105
68	End	36.000	0.27	3.10	0.90	0.24	2.79	10.0	15.0	5.5	15.32	23.42	5.07	30	0.28	65.25	65.35	66.73	66.82	68.11	71.15	F101-100
69	68	40.000	0.24	2.83	0.90	0.22	2.55	10.0	14.8	5.5	14.08	18.59	4.05	30	0.17	65.32	65.39	66.99	67.05	71.15	71.15	F102-101
70	69	145.000	0.33	2.59	0.90	0.30	2.33	10.0	13.9	5.7	13.25	25.83	4.30	30	0.34	65.39	65.88	67.09	67.23	71.15	71.30	F103-102
71	70	74.652	0.20	2.26	0.90	0.18	2.03	10.0	13.6	5.7	11.68	13.60	4.87	24	0.31	66.13	66.36	67.56	67.79	71.30	70.80	F104-103
72	71	10.491	0.28	2.06	0.90	0.25	1.85	10.0	13.5	5.8	10.66	15.13	4.10	24	0.38	66.36	66.40	67.92	67.93	70.80	70.80	F105-104
73	72	185.426	0.31	1.63	0.90	0.28	1.47	10.0	12.5	6.0	8.74	13.47	3.29	24	0.30	66.40	66.96	68.20	68.39	70.80	70.80	F106-105
74	73	75.203	0.38	1.00	0.90	0.34	0.90	10.0	12.1	6.0	5.43	6.29	3.08	18	0.31	66.96	67.19	68.60	68.77	70.80	70.70	F107-106
75	74	219.340	0.37	0.37	0.90	0.33	0.33	10.0	10.0	6.5	2.16	4.95	2.10	15	0.50	67.19	68.29	68.91	69.14	70.70	70.70	F108-107
76	73	11.568	0.32	0.32	0.90	0.29	0.29	10.0	10.0	6.5	1.87	5.04	2.64	15	0.52	67.49	67.55	68.60	68.09	70.80	70.80	F110-106
77	74	94.449	0.25	0.25	0.90	0.23	0.23	10.0	10.0	6.5	1.46	4.93	1.20	15	0.50	67.28	67.75	68.91	68.95	70.70	71.00	F111-107
78	72	128.625	0.15	0.15	0.90	0.14	0.14	10.0	10.0	6.5	0.88	4.97	0.73	15	0.51	66.40	67.05	68.20	68.22	70.80	70.30	F109-105
79	End	98.000	0.60	4.89	0.90	0.54	4.40	10.0	13.9	5.7	25.03	53.63	6.06	36	0.55	65.25	65.79	67.05	67.40	68.63	71.85	G101-100
80	79	84.000	0.78	3.21	0.90	0.70	2.89	10.0	13.3	5.8	16.74	55.18	4.99	36	0.58	65.79	66.28	67.40	67.59	71.85	70.15	G107-101
81	80	108.000	0.07	2.43	0.90	0.06	2.19	10.0	12.4	6.0	13.08	36.13	4.57	36	0.25	66.28	66.55	67.59	67.79	70.15	72.00	G108-107
82	81	154.411	0.33	0.91	0.90	0.30	0.82	10.0	11.2	6.2	5.10	7.27	3.17	18	0.41	66.55	67.18	68.08	68.35	72.00	71.00	G113-108
83	82	56.142	0.11	0.33	0.90	0.10	0.30	10.0	10.6	6.4	1.89	4.94	3.71	15	0.50	67.99	68.27	68.53	68.82	71.00	71.60	G114-113
84	83	35.192	0.22	0.22	0.90	0.20	0.20	10.0	10.0	6.5	1.29	5.00	2.88	15	0.51	68.27	68.45	68.82	68.90	71.60	71.70	G115-114

Project File: master pipe network - 01-15-20.stm

Number of lines: 102

Run Date: 1/14/2020

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

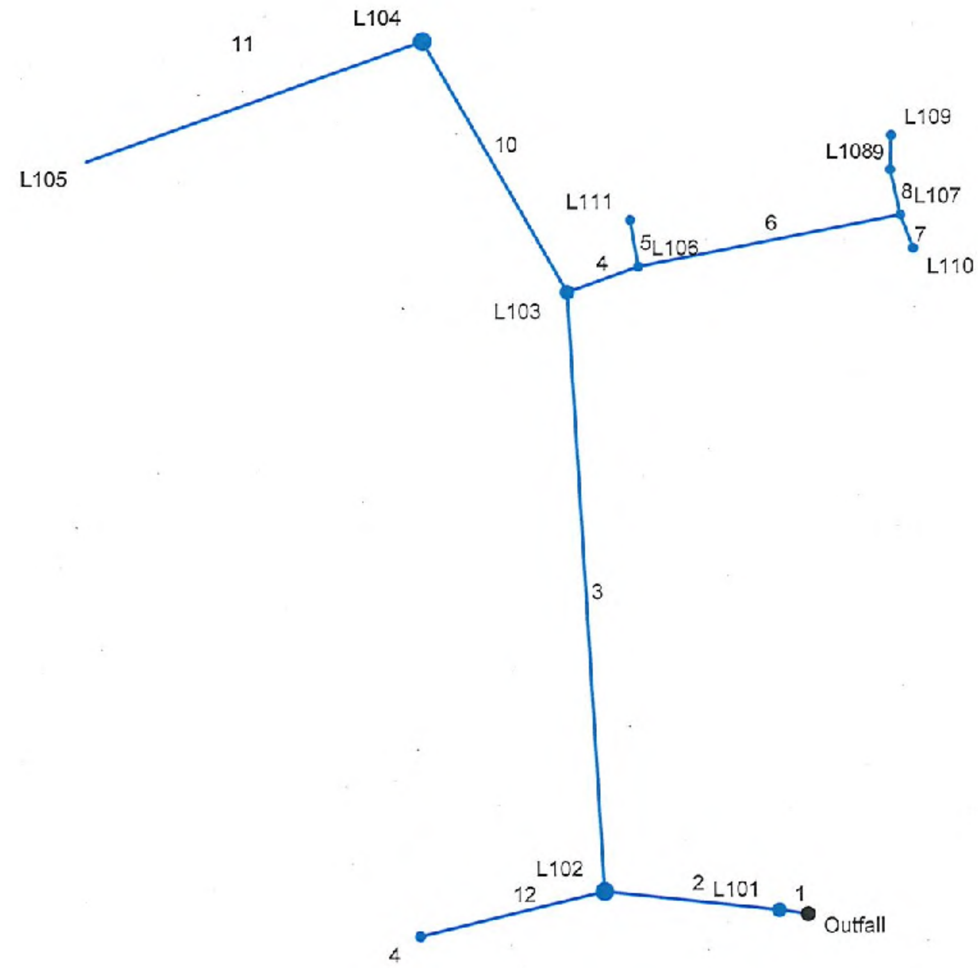
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
85	79	93.000	0.28	1.08	0.90	0.25	0.97	10.0	11.9	6.1	5.89	9.36	4.40	18	0.68	66.14	66.77	67.40	67.71	71.85	71.70	G102-101
86	85	42.000	0.22	0.80	0.90	0.20	0.72	10.0	11.7	6.1	4.41	8.04	4.18	18	0.50	66.77	66.98	67.71	67.78	71.70	71.80	G103-102
87	86	190.664	0.15	0.58	0.90	0.14	0.52	10.0	10.5	6.4	3.33	4.96	4.33	15	0.50	67.23	68.19	67.98	68.94	71.80	71.20	G104-103
88	87	62.296	0.43	0.43	0.90	0.39	0.39	10.0	10.0	6.5	2.51	4.93	3.17	15	0.50	68.19	68.50	69.23	69.13	71.20	71.30	G105-104
89	81	78.097	0.28	1.45	0.90	0.25	1.31	10.0	11.8	6.1	7.94	13.30	3.27	24	0.29	66.55	66.78	68.08	68.15	72.00	71.70	G109-108
90	89	40.950	0.23	1.17	0.90	0.21	1.05	10.0	11.5	6.2	6.48	12.11	2.81	24	0.24	66.78	66.88	68.19	68.22	71.70	71.80	G110-109
91	90	200.646	0.42	0.63	0.90	0.38	0.57	10.0	10.4	6.4	3.63	4.94	3.35	15	0.50	66.96	67.96	68.35	68.88	71.80	71.80	G111-110
92	91	24.183	0.21	0.21	0.90	0.19	0.19	10.0	10.0	6.5	1.23	4.93	2.13	15	0.50	67.96	68.08	69.10	68.52	71.80	71.80	G112-111
93	82	12.926	0.25	0.25	0.90	0.23	0.23	10.0	10.0	6.5	1.46	5.15	2.52	15	0.54	67.68	67.75	68.52	68.23	71.00	71.00	G116-113
94	90	128.162	0.31	0.31	0.90	0.28	0.28	10.0	10.0	6.5	1.81	4.79	2.82	15	0.47	67.50	68.10	68.35	68.63	71.80	71.50	G110A-110
95	End	59.658	0.44	0.44	0.60	0.26	0.26	10.0	10.0	6.5	9.79	13.75	4.35	19 x 30 e	0.34	67.50	67.70	68.47	68.78	69.50	69.70	E104-103
96	End	14.767	0.34	0.34	0.90	0.31	0.31	10.0	10.0	6.5	1.99	5.76	3.73	15	0.68	67.50	67.60	68.06	68.16	68.94	70.60	H101-100
97	End	44.109	0.47	0.47	0.60	0.28	0.28	10.0	10.0	6.5	11.62	15.99	4.91	19 x 30 e	0.45	67.20	67.40	68.19	68.60	69.30	69.40	E102-101
98	End	102.787	0.07	1.93	0.90	0.06	1.19	10.0	10.5	6.4	7.61	7.64	2.45	24	0.10	66.40	66.50	68.34	68.43	68.73	69.25	J101-100
99	98	23.496	0.04	1.86	0.90	0.04	1.13	10.0	10.3	6.4	7.25	8.76	2.32	24	0.13	66.50	66.53	68.46	68.47	69.25	69.28	J102-101
100	99	40.996	1.82	1.82	0.60	1.09	1.09	10.0	10.0	6.5	7.10	7.65	2.26	24	0.10	66.53	66.57	68.54	68.57	69.28	69.32	J103-102
101	End	40.107	0.85	0.85	0.90	0.77	0.77	10.0	10.0	6.5	4.97	8.03	2.81	18	0.50	65.00	65.20	68.59	68.67	68.00	69.80	M101-100
102	End	69.128	0.32	0.32	0.90	0.29	0.29	10.0	10.0	6.5	1.87	6.84	1.06	18	0.36	65.00	65.25	67.61	67.63	71.00	71.00	I101-100

Project File: master pipe network - 01-15-20.stm | Number of lines: 102 | Run Date: 1/14/2020

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan

25-YR



Project File: L-line network - 01-15-20.stm	Number of lines: 12	Date: 1/14/2020

Storm Sewers v12.00

Storm Sewer Tabulation

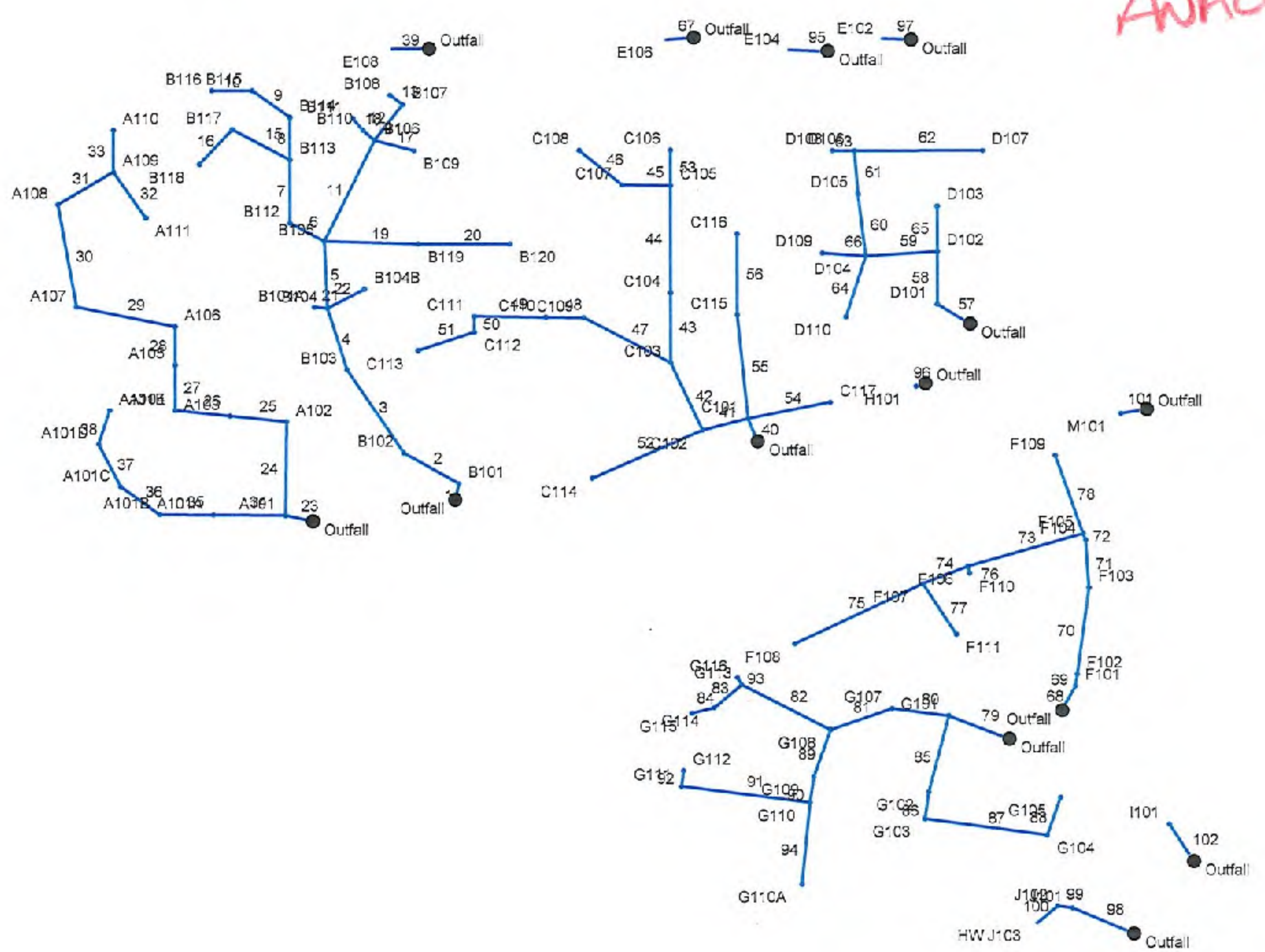
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	14.508	0.00	5.48	0.90	0.00	3.55	10.0	12.7	5.9	79.98	108.1	7.78	48	0.48	60.87	60.94	64.46	63.65	65.53	71.75	L101-100
2	1	87.964	0.00	5.48	0.90	0.00	3.55	10.0	12.4	6.0	80.14	111.3	9.24	48	0.51	62.43	62.88	64.94	65.59	71.75	72.60	L102-101
3	2	304.649	0.00	5.48	0.90	0.00	3.55	10.0	11.4	6.2	60.73	109.2	7.31	48	0.49	62.88	64.38	65.59	66.73	72.60	72.30	L103-102
4	3	37.862	0.10	0.86	0.90	0.09	0.77	10.0	11.2	6.2	4.81	4.96	4.44	15	0.50	65.68	65.87	66.73	66.89	72.30	71.25	L106-103
5	4	23.947	0.09	0.09	0.90	0.08	0.08	10.0	10.0	6.5	0.53	4.95	2.58	15	0.50	67.93	68.05	68.21	68.33	71.25	71.25	L111-106
6	4	133.836	0.13	0.67	0.90	0.12	0.60	10.0	10.5	6.4	3.85	4.95	3.36	15	0.50	65.87	66.54	67.20	67.56	71.25	71.00	L107-106
7	6	18.193	0.21	0.21	0.90	0.19	0.19	10.0	10.0	6.5	1.23	7.52	2.21	15	1.15	66.79	67.00	67.76	67.44	71.00	70.40	L110-107
8	6	23.448	0.10	0.33	0.90	0.09	0.30	10.0	10.3	6.4	1.91	5.00	2.78	15	0.51	66.79	66.91	67.76	67.46	71.00	71.00	L108-107
9	8	17.510	0.23	0.23	0.90	0.21	0.21	10.0	10.0	6.5	1.35	5.02	2.95	15	0.51	66.91	67.00	67.46	67.46	71.00	70.40	L109-108
10	3	147.000	0.00	4.62	0.90	0.00	2.77	10.0	10.7	6.3	56.38	118.3	7.54	48	0.58	64.38	65.23	66.73	67.49	72.30	70.85	L104-103
11	10	179.000	4.62	4.62	0.60	2.77	2.77	10.0	10.0	6.5	56.81	106.0	7.75	48	0.46	65.23	66.06	67.49	68.33	70.85	70.56	L105-104
12	2	95.000	0.00	0.00	0.90	0.00	0.00	10.0	10.0	0.0	20.19	32.23	5.33	30	0.53	63.25	63.75	65.59	65.27	72.60	68.50	OS4-L102

Project File: L-line network - 01-15-20.stm | Number of lines: 12 | Run Date: 1/14/2020

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan

100 YR
ANALYSIS



Project File: master pipe network - 10-23-19.stm	Number of lines: 102	Date: 10/23/2019

Storm Sewers v12.00

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
102	End	69.128	0.32	0.32	0.90	0.29	0.29	10.0	10.0	7.8	2.24	6.84	1.27	18	0.36	65.00	65.25	67.61	67.64	71.00	71.00	I101-100
101	End	40.107	0.85	0.85	0.90	0.77	0.77	10.0	10.0	7.8	5.96	8.03	3.37	18	0.50	65.00	65.20	68.59	68.70	68.00	69.80	M101-100
100	99	40.996	1.82	1.82	0.60	1.09	1.09	10.0	10.0	7.8	8.51	7.65	2.71	24	0.10	66.53	66.57	68.62	68.67	69.28	69.32	J103-102
99	98	23.496	0.04	1.86	0.90	0.04	1.13	10.0	10.3	7.7	8.71	8.76	2.77	24	0.13	66.50	66.53	68.51	68.53	69.25	69.28	J102-101
98	End	102.787	0.07	1.93	0.90	0.06	1.19	10.0	10.4	7.7	9.15	7.64	2.93	24	0.10	66.40	66.50	68.34	68.47	68.73	69.25	J101-100
97	End	44.109	0.47	0.47	0.60	0.28	0.28	10.0	10.0	7.8	11.99	15.99	5.06	19 x 30 e	0.45	67.20	67.40	68.19	68.60	69.30	69.40	E102-101
96	End	14.767	0.34	0.34	0.90	0.31	0.31	10.0	10.0	7.8	2.38	5.76	4.21	15	0.68	67.50	67.60	68.06	68.22	68.94	70.60	H101-100
95	End	59.658	0.44	0.44	0.60	0.26	0.26	10.0	10.0	7.8	10.13	13.75	4.38	19 x 30 e	0.34	67.50	67.70	68.47	68.84	69.50	69.70	E104-103
94	90	128.162	0.31	0.31	0.90	0.28	0.28	10.0	10.0	7.8	2.17	4.79	2.13	15	0.47	67.50	68.10	68.82	68.94	71.80	71.50	G110A-110
93	82	12.926	0.25	0.25	0.90	0.23	0.23	10.0	10.0	7.8	1.75	5.15	1.43	15	0.54	67.68	67.75	69.18	69.19	71.00	71.00	G116-113
92	91	24.183	0.21	0.21	0.90	0.19	0.19	10.0	10.0	7.8	1.47	4.93	1.20	15	0.50	67.96	68.08	69.80	69.81	71.80	71.80	G112-111
91	90	200.646	0.42	0.63	0.90	0.38	0.57	10.0	10.3	7.7	4.36	4.94	3.56	15	0.50	66.96	67.96	68.82	69.60	71.80	71.80	G111-110
90	89	40.950	0.23	1.17	0.90	0.21	1.05	10.0	11.3	7.5	7.85	12.11	2.57	24	0.24	66.78	66.88	68.68	68.72	71.70	71.80	G110-109
89	81	78.097	0.28	1.45	0.90	0.25	1.31	10.0	11.5	7.4	9.64	13.30	3.11	24	0.29	66.55	66.78	68.55	68.65	72.00	71.70	G109-108
88	87	62.296	0.43	0.43	0.90	0.39	0.39	10.0	10.0	7.8	3.01	4.93	2.46	15	0.50	68.19	68.50	69.67	69.75	71.20	71.30	G105-104
87	86	190.664	0.15	0.58	0.90	0.14	0.52	10.0	10.4	7.7	4.01	4.96	3.26	15	0.50	67.23	68.19	68.88	69.51	71.80	71.20	G104-103
86	85	42.000	0.22	0.80	0.90	0.20	0.72	10.0	11.4	7.4	5.34	8.04	3.02	18	0.50	66.77	66.98	68.65	68.74	71.70	71.80	G103-102
85	79	123.216	0.28	1.08	0.90	0.25	0.97	10.0	11.6	7.4	7.16	8.13	4.05	18	0.51	66.14	66.77	68.12	68.61	70.00	71.70	G102-101
84	83	35.192	0.22	0.22	0.90	0.20	0.20	10.0	10.0	7.8	1.54	5.00	3.04	15	0.51	68.27	68.45	68.87	68.94	71.60	71.70	G115-114
83	82	56.142	0.11	0.33	0.90	0.10	0.30	10.0	10.5	7.7	2.28	4.94	2.89	15	0.50	67.99	68.27	69.16	68.87	71.00	71.60	G114-113
82	81	154.411	0.33	0.91	0.90	0.30	0.82	10.0	11.0	7.5	6.17	7.27	3.49	18	0.41	66.55	67.18	68.55	69.00	72.00	71.00	G113-108

Project File: master pipe network - 10-23-19.stm | Number of lines: 102 | Run Date: 10/23/2019

NOTES:Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewers v12.00

- DENOTES SURCHARGED PIPE
HGL at OR BELOW RIM ELEV. (ADEQUATE FLOW)

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
81	80	100.953	0.07	2.43	0.90	0.06	2.19	10.0	12.0	7.3	15.93	36.67	3.30	36	0.26	66.29	66.55	68.34	68.39	70.00	72.00	G108-107
80	79	88.002	0.78	3.21	0.90	0.70	2.89	10.0	12.7	7.1	20.53	36.13	4.16	36	0.25	66.07	66.29	68.12	68.20	70.00	70.00	G107-101
79	End	100.172	0.60	4.89	0.90	0.54	4.40	10.0	13.2	7.0	30.78	33.08	6.28	36	0.21	65.25	65.46	67.05	67.63	68.63	70.00	G101-100
78	72	128.625	0.15	0.15	0.90	0.14	0.14	10.0	10.0	7.8	1.05	4.97	0.86	15	0.51	66.40	67.05	68.55	68.58	70.80	70.30	F109-105
77	74	94.449	0.25	0.25	0.90	0.23	0.23	10.0	10.0	7.8	1.75	4.93	1.43	15	0.50	67.28	67.75	69.53	69.59	70.70	71.00	F111-107
76	73	11.568	0.32	0.32	0.90	0.29	0.29	10.0	10.0	7.8	2.24	5.04	1.83	15	0.52	67.49	67.55	69.06	69.07	70.80	70.80	F110-106
75	74	219.340	0.37	0.37	0.90	0.33	0.33	10.0	10.0	7.8	2.59	4.95	2.11	15	0.50	67.19	68.29	69.53	69.83	70.70	70.70	F108-107
74	73	75.203	0.38	1.00	0.90	0.34	0.90	10.0	11.7	7.3	6.61	6.29	3.74	18	0.31	66.96	67.19	69.06	69.31	70.80	70.70	F107-106
73	72	185.426	0.31	1.63	0.90	0.28	1.47	10.0	12.1	7.3	10.65	13.47	3.41	24	0.30	66.40	66.96	68.55	68.88	70.80	70.80	F106-105
72	71	10.491	0.28	2.06	0.90	0.25	1.85	10.0	13.0	7.1	13.07	15.13	4.27	24	0.38	66.36	66.40	68.25	68.27	70.80	70.80	F105-104
71	70	74.652	0.20	2.26	0.90	0.18	2.03	10.0	13.0	7.0	14.32	13.60	4.90	24	0.31	66.13	66.36	67.89	68.12	71.30	70.80	F104-103
70	69	136.494	0.33	2.59	0.90	0.30	2.33	10.0	13.3	7.0	16.27	24.35	4.60	30	0.30	65.47	65.88	67.28	67.48	71.30	71.30	F103-102
69	68	18.704	0.24	2.83	0.90	0.22	2.55	10.0	14.0	6.8	17.41	25.16	4.67	30	0.32	65.41	65.47	67.20	67.23	71.30	71.30	F102-101
68	End	43.995	0.27	3.10	0.90	0.24	2.79	10.0	14.0	6.8	19.01	26.79	6.06	30	0.36	65.25	65.41	66.73	66.98	68.11	71.30	F101-100
67	End	42.165	1.16	1.16	0.60	0.70	0.70	10.0	10.0	7.8	8.97	12.67	3.99	19 x 30 e	0.28	68.40	68.52	69.48	69.60	70.40	70.52	E106-105
66	59	67.076	0.17	0.17	0.90	0.15	0.15	10.0	10.0	7.8	1.19	2.75	1.52	12	0.51	68.00	68.34	70.11	70.17	71.25	71.50	D109-104
65	58	71.506	0.43	0.43	0.90	0.39	0.39	10.0	10.0	7.8	3.01	4.96	2.46	15	0.50	68.00	68.36	69.53	69.66	72.50	71.40	D103-102
64	59	100.940	0.36	0.36	0.90	0.32	0.32	10.0	10.0	7.8	2.52	2.72	3.21	12	0.50	68.00	68.50	70.11	70.54	71.25	71.00	D110-104
63	61	34.000	0.29	0.29	0.90	0.26	0.26	10.0	10.0	7.8	2.03	4.95	1.66	15	0.50	68.76	68.93	71.11	71.14	72.20	72.00	D108-106
62	61	197.932	0.36	0.36	0.90	0.32	0.32	10.0	10.0	7.8	2.52	4.95	2.06	15	0.50	68.76	69.75	71.11	71.37	72.20	72.00	D107-106
61	60	67.873	0.26	0.91	0.90	0.23	0.82	10.0	11.6	7.4	6.04	7.81	3.42	18	0.47	68.44	68.76	70.74	70.93	71.50	72.20	D106-105

Project File: master pipe network - 10-23-19.stm | Number of lines: 102 | Run Date: 10/23/2019

NOTES:Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
60	59	98.288	0.42	1.33	0.90	0.38	1.20	10.0	11.9	7.3	8.73	7.61	4.94	18	0.45	68.00	68.44	70.11	70.68	71.25	71.50	D105-104
59	58	110.817	0.17	2.03	0.90	0.15	1.83	10.0	12.3	7.2	13.18	16.46	4.31	24	0.45	67.50	68.00	69.53	69.80	72.50	71.25	D104-102
58	57	83.390	0.00	2.46	0.90	0.00	2.21	10.0	12.7	7.1	15.74	26.20	4.05	30	0.35	67.21	67.50	69.18	69.24	71.40	72.50	D102-101
57	End	59.114	0.37	2.83	0.90	0.33	2.55	10.0	13.1	7.0	17.86	26.48	5.90	30	0.36	67.00	67.21	68.43	68.74	69.80	71.40	D101-100
56	55	127.964	0.62	0.62	0.90	0.56	0.56	10.0	10.0	7.8	4.35	4.95	3.54	15	0.50	68.51	69.15	70.85	71.34	72.00	72.40	C116-115
55	40	163.863	0.46	1.08	0.90	0.41	0.97	10.0	10.6	7.6	7.41	8.05	4.20	18	0.50	67.69	68.51	70.11	70.80	72.10	72.00	C115-101
54	40	129.970	0.18	0.18	0.90	0.16	0.16	10.0	10.0	7.8	1.26	4.91	1.05	15	0.49	68.36	69.00	70.11	70.15	72.10	71.50	C117-101
53	44	55.132	0.50	0.50	0.90	0.45	0.45	10.0	10.0	7.8	3.51	4.99	2.86	15	0.51	69.22	69.50	72.85	72.99	72.60	72.90	C106-105
52	41	186.617	0.59	0.59	0.90	0.53	0.53	10.0	10.0	7.8	4.14	4.94	3.37	15	0.50	68.64	69.57	70.48	71.13	73.10	73.10	C114-102
51	50	91.867	0.35	0.35	0.90	0.32	0.32	10.0	10.0	7.8	2.45	2.73	3.12	12	0.50	70.54	71.00	72.33	72.70	74.50	74.00	C113-112
50	49	24.656	0.36	0.71	0.90	0.32	0.64	10.0	10.5	7.7	4.89	4.88	3.99	15	0.49	70.42	70.54	71.97	72.09	74.50	74.50	C112-111
49	48	110.785	0.16	0.87	0.90	0.14	0.78	10.0	10.6	7.6	5.97	8.02	3.47	18	0.50	69.87	70.42	71.51	71.78	73.50	74.50	C111-110
48	47	58.965	0.20	1.07	0.90	0.18	0.96	10.0	11.1	7.5	7.21	7.98	4.08	18	0.49	68.58	68.87	71.23	71.47	73.40	73.50	C110-109
47	42	152.180	0.73	1.80	0.90	0.66	1.62	10.0	11.4	7.4	12.03	14.46	3.83	24	0.35	67.80	68.33	70.75	71.12	72.60	73.40	C109-103
46	45	85.920	0.39	0.39	0.90	0.35	0.35	10.0	10.0	7.8	2.73	4.95	2.23	15	0.50	70.48	70.91	73.28	73.41	74.00	74.60	C108-107
45	44	75.002	0.25	0.64	0.90	0.23	0.58	10.0	10.6	7.6	4.39	4.98	3.58	15	0.51	70.10	70.48	72.85	73.14	72.60	74.00	C107-105
44	43	169.102	0.33	1.47	0.90	0.30	1.32	10.0	11.0	7.5	9.96	8.39	5.63	18	0.54	68.93	69.85	71.06	72.36	72.60	72.60	C105-104
43	42	109.868	0.37	1.84	0.90	0.33	1.66	10.0	11.5	7.4	12.25	14.41	3.90	24	0.35	68.30	68.68	70.75	71.02	72.60	72.60	C104-103
42	41	116.889	0.32	3.96	0.90	0.29	3.56	10.0	12.0	7.3	25.88	42.79	3.71	36	0.35	67.39	67.80	70.48	70.60	73.10	72.60	C103-102
41	40	72.836	0.00	4.55	0.90	0.00	4.10	10.0	12.6	7.1	29.22	42.33	4.19	36	0.34	67.14	67.39	70.11	70.20	72.10	73.10	C102-101
40	End	38.596	0.34	6.15	0.90	0.31	5.54	10.0	12.9	7.1	39.11	43.52	7.37	36	0.36	67.00	67.14	69.03	69.33	68.44	72.10	C101-100

Project File: master pipe network - 10-23-19.stm | Number of lines: 102 | Run Date: 10/23/2019

NOTES:Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
39	End	56.718	0.91	0.91	0.60	0.55	0.55	10.0	10.0	7.8	4.25	6.57	4.62	15	0.88	70.50	71.00	71.43	71.83	72.00	73.00	E108-107
38	37	55.573	0.18	0.18	0.90	0.16	0.16	10.0	10.0	7.8	1.26	4.97	1.03	15	0.50	71.00	71.28	73.20	73.22	74.00	74.00	A101E-101D
37	36	74.628	0.48	0.66	0.90	0.43	0.59	10.0	10.9	7.5	4.48	5.10	2.54	18	0.20	70.85	71.00	73.01	73.13	74.00	74.00	A101D-101C
36	35	74.838	0.00	0.66	0.90	0.00	0.59	10.0	11.4	7.4	4.41	8.00	2.50	18	0.49	70.48	70.85	72.85	72.96	74.00	74.00	A101C-101B
35	34	82.742	0.28	0.94	0.90	0.25	0.85	10.0	11.9	7.3	6.18	11.11	1.97	24	0.21	70.31	70.48	72.76	72.81	73.70	74.00	A101B-101A
34	23	111.858	0.18	1.12	0.90	0.16	1.01	10.0	12.6	7.1	7.20	10.87	2.29	24	0.20	70.09	70.31	72.65	72.75	76.00	73.70	A101A-100
33	31	64.751	0.47	0.47	0.90	0.42	0.42	10.0	10.0	7.8	3.30	4.92	2.69	15	0.49	72.18	72.50	75.47	75.61	75.00	75.00	A110-109
32	31	87.694	0.14	0.14	0.90	0.13	0.13	10.0	10.0	7.8	0.98	2.73	1.25	12	0.50	72.56	73.00	75.47	75.52	75.00	75.00	A111-109
31	30	100.368	0.59	1.20	0.90	0.53	1.08	10.0	11.2	7.5	8.08	12.23	2.57	24	0.25	71.59	71.84	75.25	75.36	76.00	75.00	A109-108
30	29	164.237	0.23	1.43	0.90	0.21	1.29	10.0	11.8	7.3	9.42	12.24	3.00	24	0.25	71.18	71.59	74.88	75.12	74.80	76.00	A108-107
29	28	155.921	0.62	2.05	0.90	0.56	1.85	10.0	12.7	7.1	13.12	17.06	2.67	30	0.15	70.95	71.18	74.64	74.77	74.25	74.80	A107-106
28	27	59.454	0.80	2.85	0.90	0.72	2.57	10.0	13.6	6.9	17.70	18.22	3.61	30	0.17	70.85	70.95	74.35	74.44	74.20	74.25	A106-105
27	26	71.866	0.39	3.24	0.90	0.35	2.92	10.0	13.9	6.8	19.95	20.30	4.07	30	0.21	70.70	70.85	74.16	74.31	74.00	74.20	A105-104
26	25	85.434	0.19	3.43	0.90	0.17	3.09	10.0	14.2	6.8	20.94	17.99	4.27	30	0.16	70.56	70.70	73.69	73.88	74.00	74.00	A104-103
25	24	87.977	0.15	3.58	0.90	0.14	3.22	10.0	14.5	6.7	21.64	20.10	4.41	30	0.20	70.38	70.56	73.44	73.64	74.00	74.00	A103-102
24	23	145.752	0.40	3.98	0.90	0.36	3.58	10.0	14.9	6.6	23.82	19.82	4.85	30	0.20	70.09	70.38	72.65	73.07	76.00	74.00	A102-101
23	End	42.891	0.00	5.10	0.90	0.00	4.59	10.0	15.3	6.6	30.07	33.10	6.41	36	0.21	70.00	70.09	71.77	72.12	73.30	76.00	A101-100
22	4	65.121	0.31	0.31	0.90	0.28	0.28	10.0	10.0	7.8	2.17	4.16	1.77	15	0.35	70.77	71.00	73.67	73.74	74.60	74.00	B104B-104
21	4	20.046	0.37	0.37	0.90	0.33	0.33	10.0	10.0	7.8	2.59	4.94	2.11	15	0.50	71.15	71.25	73.67	73.70	74.60	74.50	B104A-104
20	19	142.000	0.64	0.64	0.90	0.58	0.58	10.0	10.0	7.8	4.49	4.15	3.66	15	0.35	71.50	72.00	74.44	75.03	74.30	74.00	B120-119
19	5	145.738	0.46	1.10	0.90	0.41	0.99	10.0	10.6	7.6	7.54	12.18	2.40	24	0.25	71.14	71.50	74.29	74.43	74.50	74.30	B119-105

Project File: master pipe network - 10-23-19.stm | Number of lines: 102 | Run Date: 10/23/2019

NOTES: Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

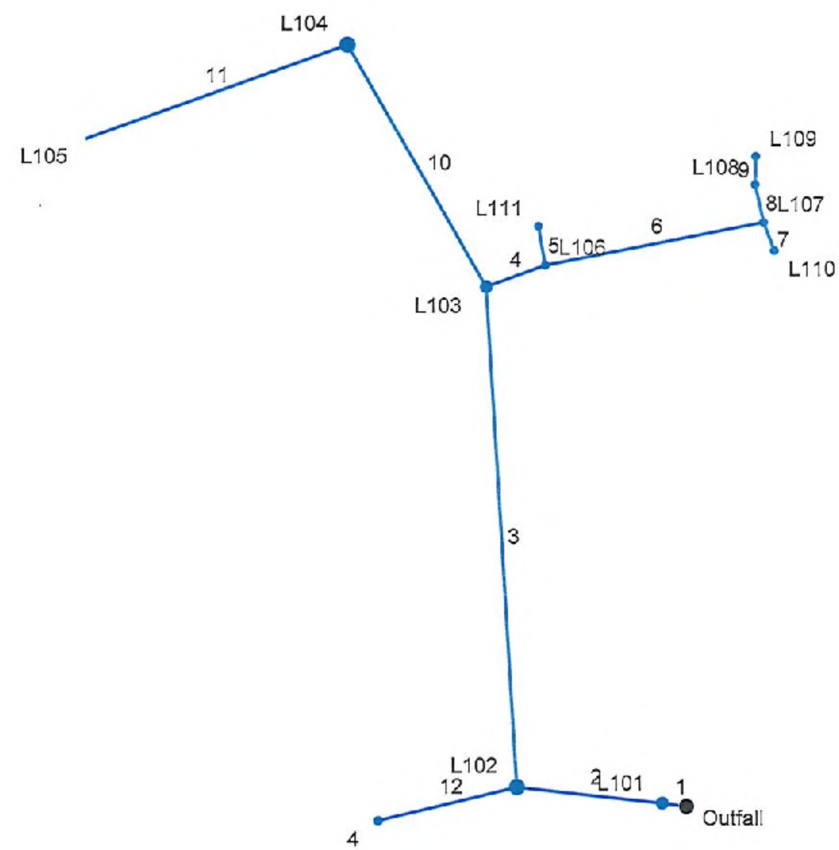
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
18	14	24.398	0.23	0.23	0.90	0.21	0.21	10.0	10.0	7.8	1.61	4.25	1.31	15	0.37	71.91	72.00	74.53	74.54	74.60	74.60	B111-110
17	11	63.118	0.47	0.47	0.90	0.42	0.42	10.0	10.0	7.8	3.30	8.10	1.86	18	0.51	71.84	72.16	74.51	74.56	74.60	74.40	B109-106
16	15	74.134	0.18	0.18	0.90	0.16	0.16	10.0	10.0	7.8	1.26	2.73	1.61	12	0.50	72.13	72.50	74.92	74.99	75.00	74.50	B118-117
15	7	100.446	0.29	0.47	0.90	0.26	0.42	10.0	10.8	7.6	3.21	4.58	2.61	15	0.43	71.70	72.13	74.60	74.81	75.00	75.00	B117-113
14	11	23.590	0.17	0.40	0.90	0.15	0.36	10.0	10.3	7.7	2.77	6.20	1.57	18	0.30	71.84	71.91	74.51	74.52	74.60	74.60	B110-106
13	12	24.252	0.05	0.05	0.90	0.05	0.05	10.0	10.0	7.8	0.35	4.92	0.29	15	0.49	72.09	72.21	74.51	74.51	74.70	74.70	B108-107
12	11	70.688	0.06	0.11	0.90	0.05	0.10	10.0	11.4	7.4	0.73	6.77	0.42	18	0.35	71.84	72.09	74.51	74.51	74.60	74.70	B107-106
11	5	176.078	0.15	1.13	0.90	0.14	1.02	10.0	14.1	6.8	6.91	15.45	2.20	24	0.40	71.14	71.84	74.29	74.43	74.50	74.60	B106-105
10	9	62.748	0.11	0.11	0.90	0.10	0.10	10.0	10.0	7.8	0.77	4.92	0.63	15	0.49	72.69	73.00	74.79	74.80	75.50	75.50	B116-115
9	8	71.501	0.14	0.25	0.90	0.13	0.23	10.0	11.7	7.4	1.65	4.96	1.35	15	0.50	72.33	72.69	74.73	74.77	75.00	75.50	B115-114
8	7	65.836	0.13	0.38	0.90	0.12	0.34	10.0	12.5	7.2	2.45	4.95	1.99	15	0.50	72.00	72.33	74.60	74.68	75.00	75.00	B114-113
7	6	99.113	0.12	0.97	0.90	0.11	0.87	10.0	13.0	7.0	6.14	14.56	1.96	24	0.35	71.35	71.70	74.48	74.55	74.70	75.00	B113-112
6	5	60.415	0.47	1.44	0.90	0.42	1.30	10.0	13.8	6.9	8.89	14.45	2.83	24	0.35	71.14	71.35	74.29	74.37	74.50	74.70	B112-105
5	4	106.221	0.21	3.88	0.90	0.19	3.49	10.0	15.3	6.6	22.90	26.22	4.67	30	0.35	70.77	71.14	73.67	73.95	74.60	74.50	B105-104
4	3	100.451	0.30	4.86	0.90	0.27	4.37	10.0	15.7	6.5	28.40	32.24	4.30	36	0.20	70.57	70.77	73.26	73.38	75.30	74.60	B104-103
3	2	157.459	0.00	4.86	0.90	0.00	4.37	10.0	16.0	6.4	28.09	31.54	4.27	36	0.19	70.27	70.57	72.96	73.16	74.00	75.30	B103-102
2	1	98.092	0.39	5.25	0.90	0.35	4.72	10.0	16.6	6.3	29.82	33.43	4.65	36	0.21	70.06	70.27	72.65	72.79	74.00	74.00	B102-101
1	End	25.884	0.32	5.57	0.90	0.29	5.01	10.0	17.0	6.2	31.32	34.79	6.63	36	0.23	70.00	70.06	71.81	72.06	72.86	74.00	B101-100

Project File: master pipe network - 10-23-19.stm | Number of lines: 102 | Run Date: 10/23/2019

NOTES:Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: L-line network - 10-23-19.stm	Number of lines: 12	Date: 10/23/2019

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	14.508	0.00	5.48	0.90	0.00	3.55	10.0	12.7	5.9	79.98	108.1	7.78	48	0.48	60.87	60.94	64.46	63.65	65.53	71.75	L101-100
2	1	87.964	0.00	5.48	0.90	0.00	3.55	10.0	12.4	6.0	80.14	111.3	9.24	48	0.51	62.43	62.88	64.94	65.59	71.75	72.60	L102-101
3	2	304.649	0.00	5.48	0.90	0.00	3.55	10.0	11.4	6.2	60.73	109.2	7.31	48	0.49	62.88	64.38	65.59	66.73	72.60	72.30	L103-102
4	3	37.862	0.10	0.86	0.90	0.09	0.77	10.0	11.2	6.2	4.81	4.96	4.44	15	0.50	65.68	65.87	66.73	66.89	72.30	71.25	L106-103
5	4	23.947	0.09	0.09	0.90	0.08	0.08	10.0	10.0	6.5	0.53	4.95	2.58	15	0.50	67.93	68.05	68.21	68.33	71.25	71.25	L111-106
6	4	133.836	0.13	0.67	0.90	0.12	0.60	10.0	10.5	6.4	3.85	4.95	3.36	15	0.50	65.87	66.54	67.20	67.56	71.25	71.00	L107-106
7	6	18.193	0.21	0.21	0.90	0.19	0.19	10.0	10.0	6.5	1.23	7.52	2.21	15	1.15	66.79	67.00	67.76	67.44	71.00	70.40	L110-107
8	6	23.448	0.10	0.33	0.90	0.09	0.30	10.0	10.3	6.4	1.91	5.00	2.78	15	0.51	66.79	66.91	67.76	67.46	71.00	71.00	L108-107
9	8	17.510	0.23	0.23	0.90	0.21	0.21	10.0	10.0	6.5	1.35	5.02	2.95	15	0.51	66.91	67.00	67.46	67.46	71.00	70.40	L109-108
10	3	169.139	0.00	4.62	0.90	0.00	2.77	10.0	10.6	6.4	56.41	110.3	7.54	48	0.50	64.38	65.23	66.73	67.49	72.30	70.85	L104-103
11	10	167.286	4.62	4.62	0.60	2.77	2.77	10.0	10.0	6.5	56.81	109.6	7.75	48	0.50	65.23	66.06	67.49	68.33	70.85	70.56	L105-104
12	2	86.127	0.00	0.00	0.90	0.00	0.00	10.0	10.0	0.0	20.19	33.85	5.33	30	0.58	63.25	63.75	65.59	65.27	72.60	68.50	OS4-L102

25YR DESIGN

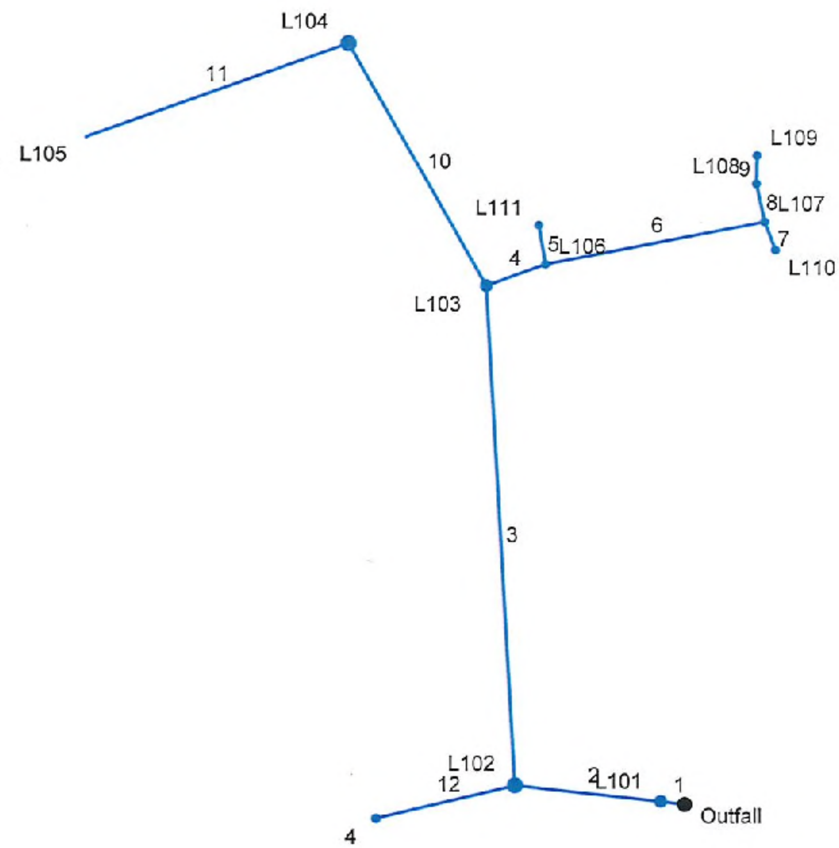
Project File: L-line network - 10-23-19.stm

Number of lines: 12

Run Date: 10/23/2019

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88 ; Return period =Yrs. 25 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: L-line network - 10-23-19.stm	Number of lines: 12	Date: 10/23/2019

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	14.508	0.00	5.48	0.90	0.00	3.55	10.0	12.4	7.2	84.46	108.1	8.08	48	0.48	60.87	60.94	64.46	63.72	65.53	71.75	L101-100
2	1	87.964	0.00	5.48	0.90	0.00	3.55	10.0	12.2	7.2	84.65	111.3	9.40	48	0.51	62.43	62.88	65.04	65.67	71.75	72.60	L102-101
3	2	304.649	0.00	5.48	0.90	0.00	3.55	10.0	11.2	7.5	65.32	109.2	7.57	48	0.49	62.88	64.38	65.67	66.82	72.60	72.30	L103-102
4	3	37.862	0.10	0.86	0.90	0.09	0.77	10.0	11.0	7.5	5.82	4.96	4.74	15	0.50	65.68	65.87	66.93	67.19	72.30	71.25	L106-103
5	4	23.947	0.09	0.09	0.90	0.08	0.08	10.0	10.0	7.8	0.63	4.95	2.71	15	0.50	67.93	68.05	68.23	68.36	71.25	71.25	L111-106
6	4	133.836	0.13	0.67	0.90	0.12	0.60	10.0	10.4	7.7	4.63	4.95	3.77	15	0.50	65.87	66.54	67.54	68.12	71.25	71.00	L107-106
7	6	18.193	0.21	0.21	0.90	0.19	0.19	10.0	10.0	7.8	1.47	7.52	1.20	15	1.15	66.79	67.00	68.34	68.35	71.00	70.40	L110-107
8	6	23.448	0.10	0.33	0.90	0.09	0.30	10.0	10.2	7.7	2.30	5.00	1.87	15	0.51	66.79	66.91	68.34	68.37	71.00	71.00	L108-107
9	8	17.510	0.23	0.23	0.90	0.21	0.21	10.0	10.0	7.8	1.61	5.02	1.31	15	0.51	66.91	67.00	68.39	68.40	71.00	70.40	L109-108
10	3	169.139	0.00	4.62	0.90	0.00	2.77	10.0	10.6	7.6	59.96	110.3	7.68	48	0.50	64.38	65.23	66.82	67.56	72.30	70.85	L104-103
11	10	167.286	4.62	4.62	0.60	2.77	2.77	10.0	10.0	7.8	60.40	109.6	7.93	48	0.50	65.23	66.06	67.56	68.40	70.85	70.56	L105-104
12	2	86.127	0.00	0.00	0.90	0.00	0.00	10.0	10.0	0.0	20.19	33.85	5.30	30	0.58	63.25	63.75	65.67	65.27	72.60	68.50	OS4-L102

100YR ANALYSIS

Project File: L-line network - 10-23-19.stm | Number of lines: 12 | Run Date: 10/23/2019

NOTES:Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

West Windsor - Mimimum Swale Slope

Project Description

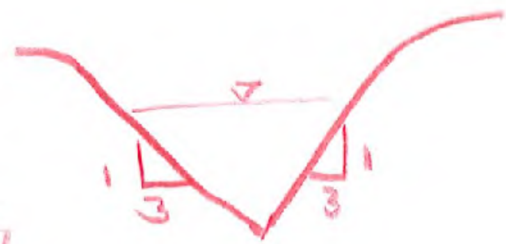
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.00250	ft/ft ← MIN SLOPE
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	10.00	ft³/s = MAX

Results

Normal Depth	1.57	ft
Flow Area	7.38	ft²
Wetted Perimeter	9.92	ft
Hydraulic Radius	0.74	ft
Top Width	9.41	ft
Critical Depth	0.93	ft
Critical Slope	0.04088	ft/ft
Velocity	1.36	ft/s
Velocity Head	0.03	ft
Specific Energy	1.60	ft
Froude Number	0.27	
Flow Type	Subcritical	



MINIMUM SWALE SECTION ANALYSED UNDER MIN & MAX SLOPE CONDITION FOR MAX 25-YR FLOW CASE.

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.57	ft
Critical Depth	0.93	ft
Channel Slope	0.00250	ft/ft
Critical Slope	0.04088	ft/ft

RESULT: SWALES to BE LINED W/ EROSION CONTROL MATTING TO PREVENT EROSION DURING CONSTRUCTION

West Windsor - Maximum Swale Slope

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.02000	ft/ft — MAX 2%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	10.00	ft^3/s — MAX

Results

Normal Depth	1.06	ft
Flow Area	3.38	ft^2
Wetted Perimeter	6.72	ft
Hydraulic Radius	0.50	ft
Top Width	6.37	ft
Critical Depth	0.93	ft
Critical Slope	0.04088	ft/ft
Velocity	2.96	ft/s ← SWALE TO BE LINED
Velocity Head	0.14	ft
Specific Energy	1.20	ft
Froude Number	0.72	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.06	ft
Critical Depth	0.93	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.04088	ft/ft

REV 1/14/20

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MERCER CO., WEST WINDSOR TWP	44.9	1.43

Project Name:	Sample Project
Description:	west windsor
Analysis Date:	10/16/19

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	40.4	Row Crop	Galestown	14.5	2,126,674
2	4.5	Woods-grass combination	Galestown	14.7	240,536
3	2.1	Impervious areas	Galestown	0.0	-
4					
5					
6					
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	47.0			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				13.9	2,367,210

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	27.3	Impervious areas	Galestown	0.0	-
2	19.7	Open space	Galestown	15.3	1,092,273
3					
4					
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	47.0			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				6.4	1,092,273

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)	1,189,188
Post-Development Annual Recharge Deficit=	**1,274,937**	(cubic feet)	

Recharge Efficiency Parameters Calculations (area averages)

RWC= 1.69	(in)	DRWC= 1.69	(in)
ERWC = 0.48	(in)	EDRWC= 0.48	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

BASIN	RECHARGE VOL
1	617,996
2	379,553
3	186,565
4	314,765

TOTAL = 1,498,879 CF

Project Name	Description	Analysis Date	BMP or LID Type
Sample Project	west windsor	10/16/19	basin 1

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	6700.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	21.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-21.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP Input Zero if Location is distributed or undetermined	SegBMP	2	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.60	in
ERWC Modified to consider dEXC	EDRWC	0.60	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.47	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.35	in
Inches of Rainfall to capture	Pdesign	0.45	in
Recharge Provided Avg. over Imp. Area		18.3	in
Runoff Captured Avg. over Imp. Area		18.9	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.02	unitless
BMP Volume	VBMP	11,725	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	1,274,937	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	405,108	sq.ft
Root Zone Water Capacity	RWC	2.10	in
RWC Modified to consider dEXC	DRWC	2.10	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	12.9	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		617,996	cu.ft
Avg BMP Recharge Efficiency		96.8%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		54.2%	%
%Runoff Recharged		17.9%	%
%Rainfall Recharged		13.9%	%

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Sample Project	west windsor	10/16/19	basin 2

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	4370.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	24.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-24.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP Input Zero if Location is distributed or undetermined	SegBMP	2	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.60	in
ERWC Modified to consider dEXC	EDRWC	0.60	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.47	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.54	in
Inches of Rainfall to capture	Pdesign	0.68	in
Recharge Provided Avg. over Imp. Area		23.2	in
Runoff Captured Avg. over Imp. Area		24.1	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.02	unitless
BMP Volume	VBMP	8,740	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check—> OK
dEXC Check—> OK
BMP Location—> OK

Parameters from Annual Recharge Worksheet

Parameter	Symbol	Value	Unit
Post-D Deficit Recharge (or desired recharge volume)	Vdef	1,274,937	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	196,020	sq.ft
Root Zone Water Capacity	RWC	2.10	in
RWC Modified to consider dEXC	DRWC	2.10	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	12.9	in

System Performance Calculated Parameters

Parameter	Symbol	Value	Unit
Annual BMP Recharge Volume		379,553	cu.ft
Avg BMP Recharge Efficiency		96.6%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		68.9%	%
%Runoff Recharged		11.0%	%
%Rainfall Recharged		8.5%	%

OTHER NOTES

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To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Sample Project	west windsor	10/16/19	basin 3

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	2290.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	24.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-24.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	2	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.60	in
ERWC Modified to consider dEXC	EDRWC	0.60	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.47	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.61	in
Inches of Rainfall to capture	Pdesign	0.75	in
Recharge Provided Avg. over Imp. Area		24.5	in
Runoff Captured Avg. over imp. Area		25.4	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.03	unitless
BMP Volume	VBMP	4,580	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	1,274,937	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	91,476	sq.ft
Root Zone Water Capacity	RWC	2.10	in
RWC Modified to consider dEXC	DRWC	2.10	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	12.9	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		186,565	cu.ft
Avg BMP Recharge Efficiency		96.3%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		72.8%	%
%Runoff Recharged		5.4%	%
%Rainfall Recharged		4.2%	%

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK

BMP Location---> OK

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

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To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Sample Project	west windsor	01/14/20	basin 4

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	2641.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	24.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-24.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP, Input Zero if Location is distributed or undetermined	SegBMP	2	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.60	in
ERWC Modified to consider dEXC	EDRWC	0.60	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.47	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.25	in
Inches of Rainfall to capture	Pdesign	0.33	in
Recharge Provided Avg. over Imp. Area		14.7	in
Runoff Captured Avg. over imp. Area		15.1	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.01	unitless
BMP Volume	VBMP	5,282	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

Parameters from Annual Recharge Worksheet

Parameter	Symbol	Value	Unit
Post-D Deficit Recharge (or desired recharge volume)	Vdef	1,274,937	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	257,004	sq.ft
Root Zone Water Capacity	RWC	2.10	in
RWC Modified to consider dEXC	DRWC	2.10	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	12.9	in

System Performance Calculated Parameters

Parameter	Symbol	Value	Unit
Annual BMP Recharge Volume		314,765	cu.ft
Avg BMP Recharge Efficiency		97.5%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		43.2%	%
%Runoff Recharged		9.1%	%
%Rainfall Recharged		7.1%	%

OTHER NOTES

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How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

NEW JERSEY 24 HOUR RAINFALL FREQUENCY DATA

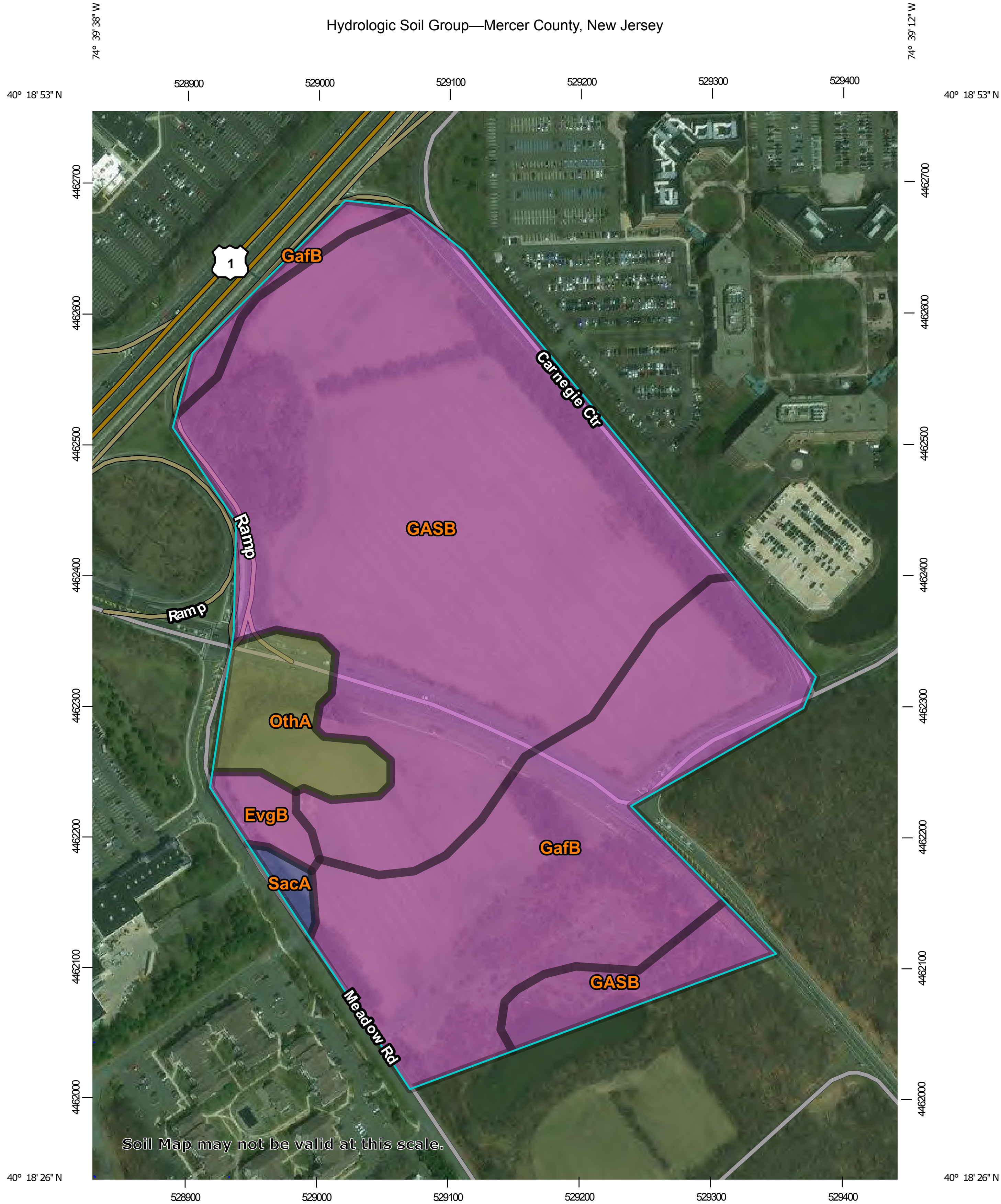
Rainfall amounts in Inches

County	1 year	2 year	5 year	10 year	25 year	50 year	100 year
Atlantic	2.72	3.31	4.30	5.16	6.46	7.61	8.90
Bergen	2.75	3.34	4.27	5.07	6.28	7.32	8.47
Burlington	2.77	3.36	4.34	5.18	6.45	7.56	8.81
Camden	2.73	3.31	4.25	5.06	6.28	7.34	8.52
Cape May	2.67	3.25	4.22	5.07	6.34	7.47	8.73
Cumberland	2.69	3.27	4.25	5.09	6.37	7.49	8.76
Essex	2.85	3.44	4.40	5.22	6.44	7.49	8.66
Gloucester	2.71	3.29	4.24	5.05	6.29	7.36	8.55
Hudson	2.73	3.31	4.23	5.02	6.19	7.20	8.31
Hunterdon	2.80	3.38	4.26	5.00	6.09	7.02	8.03
Mercer	2.74	3.31	4.23	5.01	6.19	7.20	8.33
Middlesex	2.76	3.35	4.30	5.12	6.36	7.43	8.63
Monmouth	2.79	3.38	4.38	5.23	6.53	7.66	8.94
Morris	2.94	3.54	4.47	5.24	6.37	7.32	8.35
Ocean	2.81	3.42	4.45	5.33	6.68	7.87	9.20
Passaic	2.87	3.47	4.42	5.23	6.43	7.47	8.62
Salem	2.69	3.26	4.20	5.00	6.22	7.28	8.45
Somerset	2.76	3.34	4.25	5.01	6.15	7.13	8.21
Sussex	2.68	3.22	4.02	4.70	5.72	6.60	7.58
Union	2.80	3.39	4.35	5.17	6.42	7.49	8.69
Warren	2.78	3.34	4.18	4.89	5.93	6.83	7.82

Notes: The average point rainfall amounts listed above were developed from data contained in NOAA Atlas 14 Volume 2.

Point rainfall estimates for specific locations may be obtained from the Precipitation Frequency Data Server located at http://www.nws.noaa.gov/ohd/hdsc/

For most hydrologic design procedures, the rainfall amounts listed above may be rounded to the nearest tenth of an inch.



Map Scale: 1:4,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 150, 300, 600, 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 13, Oct 6, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2015—Apr 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EvgB	Evesboro loamy sand, 0 to 5 percent slopes	A	0.9	1.7%
GafB	Galestown sandy loam, 0 to 5 percent slopes	A	15.7	30.7%
GASB	Galloway variant soils, 0 to 5 percent slopes	A	31.3	61.4%
OthA	Othello silt loams, 0 to 2 percent slopes, Northern Coastal Plain	C/D	2.7	5.4%
SacA	Sassafras sandy loam, 0 to 2 percent slopes, Northern Coastal Plain	B	0.4	0.7%
Totals for Area of Interest			**50.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

STORMWATER MANAGEMENT TESTING REPORT

West Windsor Residential Development

West Windsor Township, Mercer County, New Jersey

March 2019

Prepared For:

BOWMAN CONSULTING
303 West Main Street, Suite 350
Freehold, New Jersey 07728

Attn: Mr. R. Michael McKenna, P.E., P.P.

Prepared By:

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
14 Worlds Fair Drive, Suite A
Somerset, New Jersey 08873

GTA Job No: 31190147

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

March 8, 2019

Bowman Consulting
303 West Main Street, Suite 350
Freehold, New Jersey 07728

Attn: Mr. R. Michael McKenna, P.E., P.P.

Re: Stormwater Management Testing Report
West Windsor Residential Development
West Windsor Township, Mercer County, New Jersey

Dear Mr. McKenna:

In accordance with our agreement dated January 24, 2019, Geo-Technology Associates, Inc. (GTA) has performed subsurface explorations and testing for the planning and design of stormwater management (SWM) facilities related to a proposed residential development to be constructed in West Windsor Township, Mercer County, New Jersey. The exploration consisted of excavating 37 test pits with in-situ infiltration testing at the site, visually classifying the encountered soils, and performing limited laboratory testing. The results of the field and laboratory testing, and GTA's recommendations regarding the design and construction of the proposed SWM facilities are included in this report.

GTA appreciates the opportunity to have been of assistance to you on this project. Please contact our office at (732) 271-9301 if you have questions or require additional information.

Very truly yours,
GEO-TECHNOLOGY ASSOCIATES, INC.

Allison Tether

Allison Tether, P.G.
Senior Project Manager

Dennis C. Loh, P.E.
Vice President

AMT/DCL: at
Job No. 31190147
Attachments

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STORMWATER MANAGEMENT TESTING REPORT

WEST WINDSOR RESIDENTIAL DEVELOPMENT
WEST WINDSOR TOWNSHIP
MERCER COUNTY, NEW JERSEY
MARCH 2019

INTRODUCTION

This report presents the results of subsurface explorations and in-situ infiltration testing performed by Geo-Technology Associates, Inc. (GTA) for the planning and design of stormwater management (SWM) facilities related to a proposed residential development to be constructed in West Windsor Township, Mercer County, New Jersey. The subject site is located southeast of Route 1 between Old Meadow Road and Carnegie Center Drive. The site is divided into two portions by Meadow Road located to the north and south.

GTA was provided with a plan prepared by Bowman Consulting titled "Plan Showing Test Pit Locations" dated February 5, 2019. The plan indicates the existing topography and locations of 37 requested test pits with infiltration testing throughout the site. GTA was also provided with an untitled plan prepared by Bowman Consulting dated December 4, 2018. The plan indicates the locations and dimensions of the proposed residential structures, clubhouse structures, parking areas, and potential recharge basins.

The scope of GTA's services was to perform test pits and infiltration testing following the guidance of Appendix E of the NJ Stormwater BMP Manual and prepare a report of our findings and recommendations. According to Appendix E, test pits and infiltration tests should be performed at each infiltration location at the level of infiltration or deeper if hydraulically restrictive soils are present within 8 feet of the proposed basin bottom level. Therefore, at this site the test pits must extend at least 8 feet below the planned level of infiltration to satisfy the Appendix E guidance.

BACKGROUND

GTA previously performed a geotechnical exploration for proposed hotel and restaurant structures located adjacently north of the proposed residential development, as well as SWM testing services in a proposed basin area located adjacently east of the intersection of Old Meadow Road and Meadow Road. Our previous explorations generally encountered sandy silt soils overlying silty sands and poorly-graded sands with silt. The explorations in the basin area were performed in November and generally encountered groundwater at depths of about 6 to 7½ feet below the ground surface, corresponding to about Elevation (EL) 65 feet. The in-situ infiltration testing indicated the sandy silts were relatively impermeable compared to the underlying poorly-graded sands.

SITE CONDITIONS

The site is divided into two portions by Meadow Road, located to the north and south. The northern portion of the site is bounded by Meadow Road and the on-ramp to U.S. Route 1 north to the west, Carnegie Center Drive to the south and east, and borders agricultural land to north. The southern portion of the site is bounded by Meadow Road to the north and east, Old Meadow Road to the west, and borders wooded areas to the south. At the time of our study, the site contained agricultural land, and trees were present along the bordering roadways.

Based on our visual observations and review of the ground surface topography shown on the plan provided to us, the existing ground surface in the northern half of the site generally slopes gently downward from about Elevation (EL) 75 feet in the north to about EL 68 feet in the south along Meadow Road, where it then slopes steeply upward to the road to about EL 72 to 75 feet. The southern half of the site contains a topographic high at about EL 74 feet in the southcentral portion and gently slopes down to about EL 67 feet in the central portion of the site and back up to about EL 72 feet in the north. The southern portion of the site contains an existing basin, which is established at about EL 61 feet, and is surrounded by a berm that slopes steeply up to about EL 71 feet.

PROPOSED CONSTRUCTION

Based on the plans provided to us, we understand that the proposed residential development will include 15 residential structures and a clubhouse structure in the northern portions of the site, and 23 residential structures and a clubhouse structure in the southern portion of the site. The plan indicates three potential recharge basins located in the northern half of the site along Meadow Road, and two potential basins in the southcentral portion of the southern half of the site. Infiltration testing was requested within the potential recharge basin areas, and at several additional locations throughout the site adjacent to the proposed residential structures.

SITE GEOLOGY

The subject site is situated within the Piedmont physiographic province characterized by a low rolling plain divided by a series of higher ridges and predominantly underlain by sedimentary rocks of Triassic and Jurassic age. The site is underlain by the Stockton Formation of the Upper Triassic Period of the Mesozoic Era, as shown on the *Bedrock Geologic Map of the Princeton Quadrangle, Mercer and Middlesex Counties, New Jersey (OFM 93, 2012)* published by the New Jersey Geological and Water Survey. This formation is described as an interbedded sequence of gray, grayish-brown, or slightly reddish-brown, medium- to fine-grained, thin- to thick-bedded, conglomerate and arkosic sandstone, and reddish-brown clayey fine-grained sandstone, siltstone, and mudstone. Fining upward sequences are common, and the coarser units commonly occur as lenses. The unit is approximately 4,500 feet in thickness.

According to the *Surficial Geology of New Jersey (DGS07-2, 2013)* published as part of the Digital Geodata Series by the New Jersey Geological and Water Society, generated using data from the United States Geological Survey, the surficial geology of the northern half of the site and the portion of the site adjacently west of Meadow road in the southern half of the site are mapped as Eolian Deposits. The majority of the western portion of the southern half of the site is mapped as weathered shale, mudstone and sandstone, and a relatively thin deposit of alluvium is shown between these two units in the central portion of the southern half of the site. The Eolian deposits are described as very pale brown and yellow-brown windblown fine sand and silt and can be as much as 15 feet thick. The alluvium is described as reddish-brown, yellowish-brown, brown and gray sand, gravel, silt and minor clay with variable amounts of organic matter and can be as much as 20 feet thick. The weathered shale, mudstone, and sandstone is described as reddish-brown, yellow, and light gray silty sand to silty clay with shale, mudstone, or sandstone fragments.

Please refer to the referenced publications for more detailed descriptions of the geologic members.

SUBSURFACE EXPLORATION

The subsurface exploration program consisted of excavating a total of 37 test pits at the locations indicated on the plan provided. The test pits were excavated by Heritage Contracting Company, Inc. on February 14, 15 and 18, 2019 using a Caterpillar 308CR Excavator, and extended to depths ranging from approximately 7 to 16 feet below the existing surface grades. The exploration locations were selected and staked by Bowman Consulting prior to our exploration. In-situ infiltration tests were performed adjacent to each of the test pits at depths ranging from about 2 to 10 feet below the ground surface. Please note that the numbers shown on the test pits logs and location plan are consistent with the numbers indicated on the field stakes at each location. However, the original number sequence on the plan provided to us and the corresponding field stakes skipped a few numbers including 217, 220, 226 and 227. Therefore, even though only 37 test pits were performed, the numbering of the test pits goes up to TP-241 and the skipped numbers do not represent explorations performed for this study.

The approximate locations of the explorations performed for this study are shown on the Test Pit Location Plan, which is included as Figure 2 in Appendix A. Detailed descriptions of the encountered subsurface conditions are indicated on the Logs of Test Pits, which are presented in Appendix B. The ground surface elevations indicated on the exploration logs were obtained by interpolation between topographic contours shown on the plans, and should be considered approximate.

Soil samples obtained from the test pits were brought to GTA's laboratory for visual classification by a geotechnical engineer and limited laboratory testing. The soil descriptions shown on the logs are therefore based on visual observation of the samples, supplemented by the laboratory results.

LABORATORY TESTING

Laboratory testing performed for this study included grain-size distribution and Atterberg Limits testing for classification of the soils in accordance with the Unified Soil Classification System (USCS), and natural moisture content determinations. Detailed results of the laboratory testing performed for this study are included in Appendix C. The results of the testing are summarized in the following table:

SUMMARY OF LABORATORY TESTING

Test Pit Location	Depth (Ft)	LL (%)	PI (%)	USCS Classification	NMC (%)
TP-201	4-5	NP	NP	Silty SAND (SM)	20.6
TP-205	6½-7½	NP	NP	Poorly-graded SAND with silt (SP-SM)	10.2
TP-207	12-13	NP	NP	Poorly-graded SAND with silt and gravel (SP-SM)	27.7
TP-214	3½-4½	35.5	20.7	Sandy Lean CLAY (CL)	23.3
TP-218	2-3	19.6	4.9	Sandy, Silty CLAY (CL-ML)	18.2
TP-222	2-3	24.1	5.7	Silty, Clayey SAND (SC-SM)	18.1
TP-224	4½-5½	NP	NP	Poorly-graded SAND (SP)	22.5
TP-229	3-4	NP	NP	Well-graded SAND with silt (SW-SM)	17.6
TP-237	6-7	NP	NP	Poorly-graded SAND with gravel (SP)	10.6

Note: NMC=Natural Moisture Content, LL=Liquid Limit, PI=Plasticity Index, NP=Non-plastic

SUBSURFACE CONDITIONS

An approximately 10- to 12-inch thick layer of topsoil was encountered at the ground surface in the test pits performed for this study. The natural soils encountered below the topsoil appear to be consistent with the geologic mapping, and in the northern half of the site generally consisted of fine-grained silt or clay soils overlying silty sands and poorly-graded sands with varying amounts of silt. Clayey sands and silty, clayey sands were encountered at the surface in the eastern portion of the southern half of the site, and silty sands were encountered at the surface in the western portion of the southern half, overlying mainly poorly-graded sands with some well-graded sands encountered in Test Pits TP-228 and TP-229.

Fill materials were encountered at the ground surface in Test Pits TP-231, TP-233, TP-234, TP-235 and TP-236 performed for this study in the southern portion of the southern half of the site, adjacent to the existing basin. The extent of the fill in this area can be seen on the topographic plan. The fill extended to depths ranging from about 6 to 8½ feet below the ground surface and generally consisted of sandy silt, silty sand and poorly-graded sand soils. Relatively minor amounts of asphalt and concrete fragments were encountered within the fill.

Groundwater was encountered in 36 of the 37 test pits at depths ranging from about 4 to 13½ feet below the ground surface. Long-term groundwater readings were not obtained because the test pits were backfilled upon completion for safety considerations. Fluctuations in the groundwater level typically occur due to several factors, including variations in precipitation, seasonal changes, and site development activities. Soil mottling indicative of the seasonal high groundwater level was not observed in the test pits. We believe the seasonal high groundwater level generally corresponds to the groundwater level encountered in the explorations.

INFILTRATION TEST RESULTS

In-situ infiltration tests were performed adjacent to each of the test pits performed for this study using a double-ring infiltrometer in accordance with the ASTM D 3385 test procedure. The tests were performed at depths ranging from approximately 2 to 10 feet below the ground surface within the natural soils, and at 4 of the test locations (TP-231, TP-234, TP-235, and TP-236) the infiltration tests were performed within the existing fill materials. The results of the infiltration tests performed for this study are summarized in the following table. A factor of safety of at least 2 should be applied to the measured infiltration rates.

SUMMARY OF INFILTRATION TEST RESULTS

Test Pit Location	Approximate Test Depth* (ft)	Final Water Level Drop (in)	Time Interval (min)	USCS Classification	Measured Infiltration Rate (in/hr)
TP-201	4	⅛	10	Silty SAND with gravel (SM)	0.75
TP-202	3	0	10	Silty SAND (SM)	0
TP-203	5	2	5	Poorly-graded SAND (SP)	24
TP-204	4	1¼	6	Poorly-graded SAND with silt (SP-SM)	12.5
TP-205	6.5	2¼	10	Poorly-graded SAND with silt and gravel (SP-SM)	13.5
TP-206	5	⅛	30	Silty SAND (SM)	0.25
TP-207	5½	½	10	Silty SAND (SM)	3
TP-208	5	1	15	Poorly-graded SAND with silt and gravel (SP-SM)	4
TP-209	5	½	30	Silty SAND (SM)	3
TP-210	4½	⅝	6	Poorly-graded SAND with silt (SP-SM)	6.25
TP-211	2½	0	30	Sandy SILT (ML)	0

Test Pit Location	Approximate Test Depth* (ft)	Final Water Level Drop (in)	Time Interval (min)	USCS Classification	Measured Infiltration Rate (in/hr)
TP-212	3	0	30	Sandy SILT (ML)	0
TP-213	3	¼	10	Silty SAND (SM)	1.5
TP-214	3½	⅛	10	Sandy SILT (ML)	0.75
TP-215	2	0	10	Silty SAND (SM)	0
TP-216	2½	⅛	10	Silty SAND (SM)	0.75
TP-218	2½	0	30	Sandy SILT (ML)	0
TP-219	2	0	30	Sandy SILT (ML)	0
TP-221	4½	½	5	Silty SAND (SM)	6
TP-222	3½	⅛	30	Sandy SILT (ML)	0.25
TP-223	5	1¼	5	Poorly-graded SAND with silt (SP-SM)	15
TP-224	5	2	5	Poorly-graded SAND (SP)	24
TP-225	5	1	5	Poorly-graded SAND with silt (SP-SM)	12
TP-228	4½	¼	30	Poorly-graded SAND with silt (SP-SM)	0.5
TP-229	3	2½	10	Poorly-graded SAND with silt (SP-SM)	15
TP-230	4½	½	5	Silty SAND (SM)	6
TP-231	7	1½	10	FILL: Silty SAND with gravel (SM)	9
TP-232	4	1	10	Silty SAND (SM)	6
TP-233	10	0	30	Sandy SILT (ML)	0
TP-234	5	3	10	FILL: Poorly-graded SAND with silt (SP-SM)	18
TP-235	6	0	30	FILL: Sandy SILT (ML)	0
TP-236	5	0	30	FILL: Sandy SILT (ML)	0
TP-237	4	3	5	Poorly-graded SAND with gravel (SP)	36
TP-238	5½	2¼	10	Poorly-graded SAND with silt (SP-SM)	13.5
TP-239	3	1	10	Poorly-graded SAND with silt (SP-SM)	6
TP-240	5	2½	10	Poorly-graded SAND with silt (SP-SM)	15
TP-241	3½	¼	10	Poorly-graded SAND with silt (SP-SM)	1.5

*Beneath the existing ground surface.

CONCLUSIONS AND RECOMMENDATIONS

The primary conditions that affect the ability to infiltrate water through soil are the soil gradation and density properties and the presence of hydraulically restrictive layers such as silt or clay (fines), rock, or groundwater, each of which would restrict the flow of water into the underlying aquifer. The soil profile generally consisted of fine-grained silt and clay soils overlying silty sands and poorly-graded sands. Groundwater was encountered in the test pits at depths ranging from about 4 to 13½ feet below the ground surface. In general, the fine-grained soils (ML, CL, CL-ML) were not receptive to infiltration, the granular soils with high fines percentages (SC-SM, SC, SM) were somewhat receptive to infiltration, and the deeper coarse-grained sands (SP-SM, SP, SW-SM) appeared receptive to infiltration. GTA recommends that the existing fill materials should not be relied upon for infiltration.

We believe the infiltration test results and groundwater observations indicate that infiltration of collected stormwater is generally feasible within the deeper, natural poorly-graded sand layer and in portions of the silty sand soils. However, it appears that fine-grained soils will be present at shallow depths across most of the site and these soils are relatively impermeable. Therefore, where fine-grained soils are present at the planned level of infiltration, it will be necessary to excavate through the fine-grained soils to expose the more permeable granular soils. This process may also be required in some areas where silty sand soils are present at the planned infiltration level. In some cases, it may be possible to scarify relatively compact silty sand soils to improve their infiltration properties. We recommend additional testing be performed at the time of construction to verify the design assumptions. This testing should be performed after the subgrades are properly prepared.

Excavation for the proposed recharge areas may also encounter localized areas of silty fine-grained sand, cemented sands, clay clods and thin clay layers, or dense soils. If these soils are encountered at the planned infiltration depths, we recommend that they be undercut to expose the underlying more permeable soils. The overexcavation should then be backfilled to the proposed bottom of basin elevation using granular soils, washed gravel, or sand meeting the design infiltration rate. We anticipate a significant portion of the excavated soils will be suitable for reuse provided the clay soils can be adequately removed from the sandy soils matrix. The backfill should be placed loosely, to promote infiltration.

It will be important to limit disturbance and compaction of the infiltration surface during construction. Infiltration areas should not be exposed to unstabilized runoff that may contribute to sedimentation and clogging of the subgrade, and possible system failure, prior to the completion of construction. Where possible, the operation of heavy construction equipment directly on the infiltration area subgrades should be avoided or kept to a minimum. After grubbing and rough grading, infiltration areas should be tilled with a disc or rotary tiller followed by a leveling drag, to restore the soils to a loose condition.

Construction oversight by competent engineering personnel during installation of stormwater management facilities is critical to successful functioning of the system. Ideally, construction oversight should be provided by the geotechnical engineer, or qualified representative, retained by the project owner to document construction operations and assure that project specifications and special construction requirements are met. Periodic inspection and maintenance of the infiltration system will be required to maximize the efficiency and design life of the system.

ADDITIONAL SERVICES

We recommended that GTA be retained during construction of the subject project to provide geotechnical consultation and construction observation and testing services as outlined below:

- Provide on-site observation and testing during construction.
- Perform infiltration testing at the time of construction to document that the infiltration subgrades have been properly prepared.

LIMITATIONS

This report, including all supporting test pit logs, field data, field notes, laboratory test data, calculations, estimates and other documents prepared by GTA in connection with this project have been prepared for the exclusive use of Bowman Consulting (Client) pursuant to the Agreement between GTA and Client dated January 24, 2019, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Client is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Test pits indicate soil conditions only at specific locations and times, and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between test pit locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of GTA.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client.

This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

31190147 **GEO-TECHNOLOGY ASSOCIATES, INC.**

Important Information about Your

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* —should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your GBA-Member Geotechncial Engineer for Additional Assistance

Membership in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontaton techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.

GBA GEOPROFESSIONAL BUSINESS ASSOCIATION

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX A

Figures

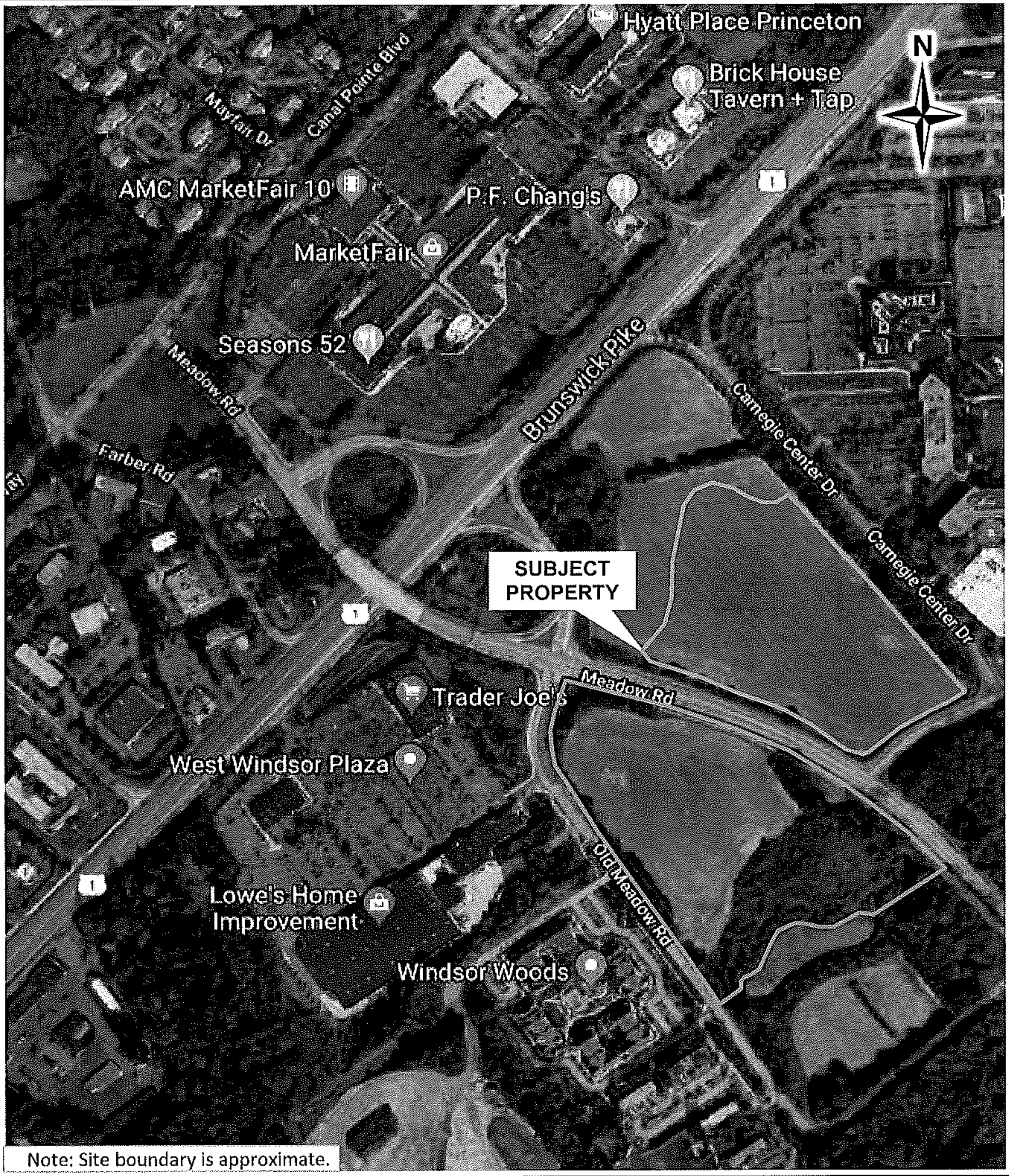


FIGURE 1: SITE LOCATION MAP

14 Worlds Fair Drive, Suite B
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

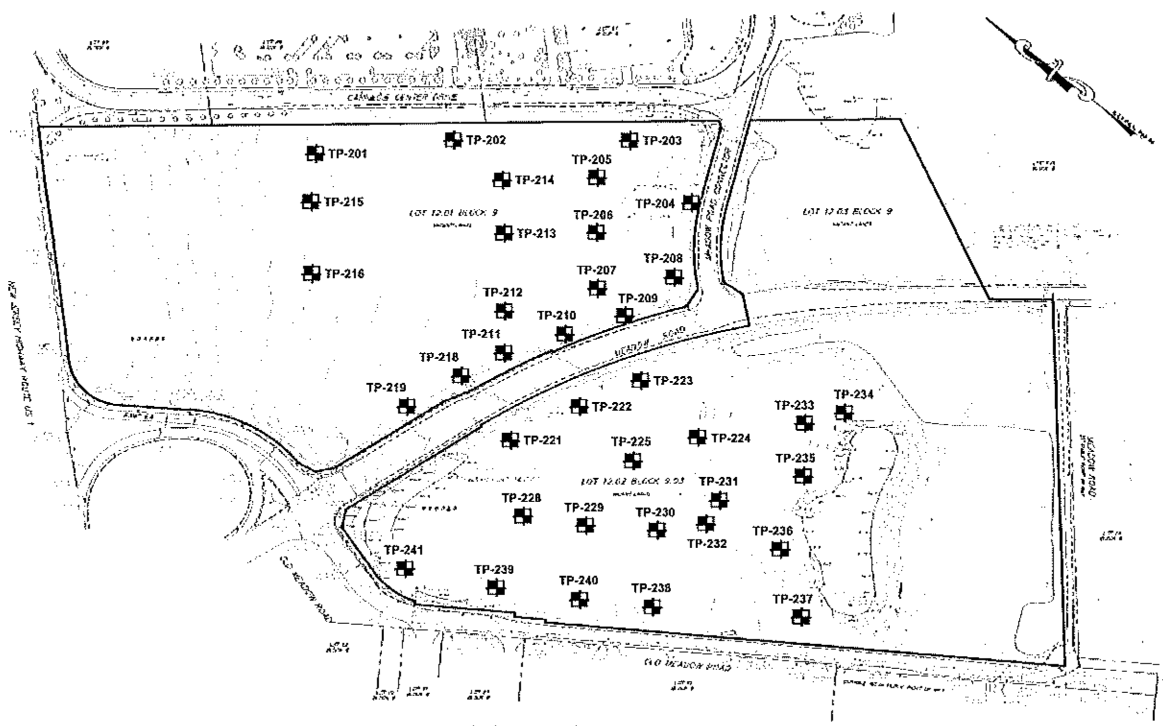
WEST WINDSOR RESIDENTIAL DEVELOPMENT

West Windsor Township,
Mercer County, New Jersey

Prepared For: Bowman Consulting

SOURCE: Google Map

SCALE: NTS	DATE: FEB. 2019	PROJECT #: 31190147



*Base plan provided by Bowman Consulting titled "Plan Showing Test Pit Locations" dated February 5, 2019.

LEGEND:

TP-X

Indicates the numbers and approximate locations of test pits performed for this study.

TEST PIT LOCATION PLAN

14 Worlds Fair Drive, Suite B
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

WEST WINDSOR RESIDENTIAL DEVELOPMENT

West Windsor Township,
Mercer County, New Jersey

Prepared For: Bowman Consulting

DESIGN BY: *	DRAWN BY: AMT	REVIEWED BY: DCL
SCALE: NTS	DATE: FEB. 2019	PROJECT #: 31190147

Figure 2

APPENDIX B

Exploration Logs

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50		ML
					CL
					OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50		MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	
UPON COMPLETION OF DRILLING	
24 HOURS AFTER COMPLETION	

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF TEST PIT NO. TP-201

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **6 Ft.**
GROUND SURFACE ELEVATION: **73 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
72.2		ML		Dark yellow-brown, distinct pale brown mottling, moist, SILT with sand	
70.5	2	SM		Dark yellow-brown, moist, Silty SAND with gravel	- NMC = 20.6% - Infiltration rate = 0.75 in/hr at 4 Ft.
68.0	4	SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt - Wet at 6 Ft. - with gravel at 10 Ft.	- Sidewall collapse at 5 Ft.
61.0	12			Test pit complete at 12 Ft.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-202

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **6 Ft.**
GROUND SURFACE ELEVATION: **72 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
71.2		CL		Yellow-brown, moist, Sandy Lean CLAY	
69.5	2	SM		Dark yellow-brown, moist, Silty SAND with gravel	- Infiltration rate = 0 in/hr at 3 Ft.
	6			- Wet at 6 Ft.	Sidewall collapse at 6 Ft.
64.0	8	CL		Dark brown, wet, Lean CLAY with shale fragments	
60.0	12			Test pit complete at 12 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-203

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **9 Ft.**
GROUND SURFACE ELEVATION: **71 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
70.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
66.0		SP		Dark yellow-brown, moist, Poorly-graded SAND	- Infiltration rate = 24 in/hr at 5 Ft.
				- Wet at 9 Ft.	▼
59.0	12			Test pit complete at 12 Ft.	

Depth scale (ft.): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-204

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **8 Ft.**
GROUND SURFACE ELEVATION: **68 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
67.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
66.0	2	SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt and clay clods	
	4				- Infiltration rate = 12.5 in/hr at 4 Ft.
63.0		SM		Dark yellow-brown and light olive-brown, moist, Silty SAND with clay clods	
	6				
60.0	8	SP-SM		Dark yellow-brown, wet, Poorly-graded SAND with silt and gravel	
	10				
57.0				Test pit complete at 11 Ft.	
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-205

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **11 Ft.**
GROUND SURFACE ELEVATION: **72 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
71.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
65.5		SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt and gravel	- NMC = 10.2% - Infiltration rate = 13.5 in/hr at 6-1/2 Ft.
	10			- Gravel grades out at 10 Ft.	
				- Wet at 11 Ft.	
	12			- Yellow-brown at 12 Ft.	
59.0				Test pit complete at 13 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-206

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **9 Ft.**
GROUND SURFACE ELEVATION: **72 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
71.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
69.0		SM		Dark yellow-brown, moist, Silty SAND with clay clods	- Infiltration rate = 0.25 in/hr at 5 Ft.
				- Wet, with gravel at 9 Ft.	
61.0	11			Test pit complete at 11 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-207

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **7.5 Ft.**
GROUND SURFACE ELEVATION: **71 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
70.2		SM		Dark yellow-brown, moist, Silty SAND with gravel	
	2				
				- Yellow-brown at 5 Ft.	
	4				
	6				- Infiltration rate = 3 in/hr at 5-1/2 Ft.
64.0		SP-SM		Dark yellow-brown, wet, Poorly-graded SAND with silt and gravel	▼
	8				
	10				
	12				- NMC = 27.7%
	14				
55.0	16			Test pit complete at 16 Ft.	
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-207

LOG OF TEST PIT NO. TP-208

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **69 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
68.2		ML		Dark yellow-brown, moist, Sandy SILT with gravel	
65.0	4	SP-SM		Light yellow-brown, moist, Poorly-graded SAND with silt and gravel - Wet at 7 Ft. - Gravel grades out at 10 Ft.	- Infiltration rate = 4 in/hr at 5 Ft.
57.0	12			Test pit complete at 12 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-209

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **68 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
67.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
63.0		SM		Light olive-brown, moist, Silty SAND - Wet at 7 Ft.	- Infiltration rate = 3 in/hr at 5 Ft.
56.0	12	SP-SM		Dark yellow-brown, wet, Poorly-graded SAND with silt and gravel	
53.0				Test pit complete at 15 Ft.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-210

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **68 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
67.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
65.5		SP-SM		Yellow-brown, moist, Poorly-graded SAND with silt	
					- Infiltration rate = 6.25 in/hr at 4-1/2 Ft.
	6			- Wet at 6 Ft.	
	7				▼
	8			- Dark yellow-brown at 8 Ft.	
55.0	13			Test pit complete at 13 Ft.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-211

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **5 Ft.**
GROUND SURFACE ELEVATION: **69 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
68.2		ML		Dark yellow-brown, moist, Sandy SILT with gravel	
	2				- Infiltration rate = 0 in/hr at 2-1/2 Ft.
	4			- Wet at 5 Ft.	▼
63.0	6	SP-SM		Light yellow-brown, wet, Poorly-graded SAND with silt	
	8			- Dark yellow-brown at 8 Ft.	
	10				
57.0	12			Test pit complete at 12 Ft.	
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

GTA
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14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-212

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **5.5 Ft.**
GROUND SURFACE ELEVATION: **70 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
69.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	- Infiltration rate = 0 in/hr at 3 Ft.
	2				
	4				
65.0		SP-SM		Light yellow-brown, wet, Poorly-graded SAND with silt	
	6				
				- Dark yellow-brown at 7 Ft.	
	8				
60.0	10			Test pit complete at 10 Ft. due to sidewall collapse.	
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-213

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **5 Ft.**
GROUND SURFACE ELEVATION: **71.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
70.7		CL		Yellow-brown, moist, Sandy Lean CLAY	
69.0	2	SM		Dark yellow-brown, moist, Silty SAND with clay clods	- Infiltration rate = 1.5 in/hr at 3 Ft.
66.5	4	SP		Dark yellow-brown, wet, Poorly-graded SAND	
59.5	12			Test pit complete at 12 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-214

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **5.5 Ft.**
GROUND SURFACE ELEVATION: **71.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
70.7		ML		Dark yellow-brown, moist, SILT with sand and gravel	
69.0	2	CL		Yellow-brown, moist, Sandy Lean CLAY	- NMC = 23.3% - Infiltration rate = 0.75 in/hr at 3-1/2 Ft.
67.5	4	SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt - Wet at 5-1/2 Ft.	
	6				
	8				
	10				
59.5	12			Test pit complete at 12 Ft.	
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-215

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **4 Ft.**
GROUND SURFACE ELEVATION: **73.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
72.7		ML		Dark yellow-brown, moist, SILT with sand and gravel	
71.0	2	SM		Light yellow-brown, moist, Silty SAND	- Infiltration rate = 0 in/hr at 2 Ft.
69.5	4	SP-SM		Dark yellow-brown, wet, Poorly-graded SAND with silt	
	6				
	8				
	10				
61.5	12			Test pit complete at 12 Ft.	
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-216

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **5 Ft.**
GROUND SURFACE ELEVATION: **74 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

DATE STARTED: **2/14/2019**
DATE COMPLETED: **2/14/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
73.2		ML		Dark yellow-brown, moist, SILT with sand and gravel	
71.5	2	SM		Dark yellow-brown, moist, Silty SAND - Wet at 5 Ft.	- Infiltration rate = 0.75 in/hr at 2-1/2 Ft.
66.0	8	SC		Gray and dark yellow-brown, mottled, wet, Clayey SAND	
62.0	12			Test pit complete at 12 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-216

LOG OF TEST PIT NO. TP-218

PROJECT:	**West Windsor Residential Development**	PROJECT NO.:	**31190147**
PROJECT LOCATION:	**West Windsor, New Jersey**		
CLIENT:	**Bowman Consulting**		
		GROUNDWATER ENCOUNTERED:	**5 Ft.**
DATE STARTED:	**2/14/2019**	GROUND SURFACE ELEVATION:	**69.5 Ft.**
DATE COMPLETED:	**2/14/2019**	DATUM:	**TOPO**
CONTRACTOR:	**Heritage Contracting Company, Inc.**	LOGGED BY:	**JMM**
EQUIPMENT:	**Caterpillar 308CR Excavator**	CHECKED BY:	**AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
68.7		CL-ML		Dark yellow-brown, moist, Sandy, Silty CLAY	- NMC = 18.2% - Infiltration rate = 0 in/hr at 2-1/2 Ft.
65.5	4	SP-SM		Yellow-brown, moist, Poorly-graded SAND with silt - Wet at 5 Ft. - Dark yellow-brown at 7 Ft. - Dark brown, with cemented soils at 9 Ft.	
56.5	13			Test pit complete at 13 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-219

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **4 Ft.**
GROUND SURFACE ELEVATION: **69 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
68.2		CL-ML		Dark yellow-brown, moist, Sandy, Silty CLAY	- Infiltration rate = 0 in/hr at 2 Ft.
66.0		SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt and clay clods - Wet at 4 Ft. - Light yellow-brown at 8 Ft. - Dark yellow-brown and gray, with cemented soils at 9 Ft.	
59.0	10	SP		Red-brown, wet, Poorly-graded SAND	
57.0	12			Test pit complete at 12 Ft.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-221

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **6 Ft.**
GROUND SURFACE ELEVATION: **67 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
66.0		ML		Dark yellow-brown, moist, SILT with sand and gravel	
	2				
64.0		SM		Dark yellow-brown, moist, Silty SAND	
	4			- Cobbles at 4 Ft.	- Infiltration rate = 6 in/hr at 4-1/2 Ft.
62.0		SP		Light yellow-brown, wet, Poorly-graded SAND	
	6				
60.0				Test pit complete at 7 Ft. due to sidewall collapse.	
	8				
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-221

LOG OF TEST PIT NO. TP-222

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **5.5 Ft.**
GROUND SURFACE ELEVATION: **67 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
66.2		SC-SM		Dark yellow-brown, moist, Silty, Clayey SAND	
	2				- NMC = 18.1%
	4			- With gravel at 4 Ft.	- Infiltration rate = 0.25 in/hr at 3-1/2 Ft.
62.0		SP-SM		Light olive-brown, moist, Poorly-graded SAND with silt - Wet at 5-1/2 Ft.	
	6				
	8				
58.0				Test pit complete at 9 Ft. due to sidewall collapse.	
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-223

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **68 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
67.2		SC-SM		Dark brown, moist, Silty, Clayey SAND	
63.0	5	SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt	- Infiltration rate = 15 in/hr at 5 Ft.
	7			- Wet at 7 Ft.	
57.0	11			Test pit complete at 11 Ft. due to sidewall collapse.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-224

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **7.5 Ft.**
GROUND SURFACE ELEVATION: **69 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
68.0		SC-SM		Dark brown, moist, Silty, Clayey SAND	
65.0	4	SP		Dark brown, moist, Poorly-graded SAND	- NMC = 22.5% - Infiltration rate = 24 in/hr at 5 Ft.
				- Wet at 7-1/2 Ft.	
				- Dark yellow-brown at 9 Ft.	
58.0	11			Test pit complete at 11 Ft. due to sidewall collapse.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-225

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **67 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
66.0		SC-SM		Dark brown, moist, Silty, Clayey SAND	
63.0	4	SP-SM		Dark brown, moist, Poorly-graded SAND with silt - Light olive-brown at 6 Ft. - Wet at 7-1/2 Ft.	- Infiltration rate = 12 in/hr at 5 Ft.
56.0				Test pit complete at 11 Ft. due to sidewall collapse.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-228

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **6.5 Ft.**
GROUND SURFACE ELEVATION: **70.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
69.5		SC-SM		Dark brown, moist, Silty, Clayey SAND	
68.5	2	SW-SM		Light olive-brown, moist, Well-graded SAND with silt and occasional clay clods	
	4				- Infiltration rate = 0.5 in/hr at 4-1/2 Ft.
	6			- Wet at 6-1/2 Ft.	▼
	8			- Dark yellow-brown at 8 Ft.	
61.5				Test pit complete at 9 Ft. due to sidewall collapse.	
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-229

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **6.5 Ft.**
GROUND SURFACE ELEVATION: **69 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
68.0		ML		Dark brown, moist, Sandy SILT	
67.0	2	SW-SM		Light olive-brown, moist, Well-graded SAND with silt	- NMC = 17.6% - Infiltration rate = 15 in/hr at 3 Ft.
	4				
	6			- Wet at 6-1/2 Ft.	
	8				
	10				
58.0				Test pit complete at 11 Ft.	
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-230

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **67.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
66.5		SM		Dark yellow-brown, moist, Silty SAND	
	2				
	4				- Infiltration rate = 6 in/hr at 4-1/2 Ft.
	6				
				- Wet at 7 Ft.	▼
	8				
	10				
56.5				Test pit complete at 11 Ft. due to sidewall collapse.	
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-230

LOG OF TEST PIT NO. TP-231

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **13 Ft.**
GROUND SURFACE ELEVATION: **73 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0				
72.3				12 In. of Topsoil	
				FILL - Dark brown, moist, silty sand with debris (asphalt and concrete fragments)	
	2				
	4				
	6				- Infiltration rate = 9 in/hr at 7 Ft.
65.0	8	SM		Dark brown, moist, Silty SAND with gravel	
	10				
61.0	12	SP		Dark yellow-brown, moist, Poorly-graded SAND with gravel - Wet at 13 Ft.	
59.0	14			Test pit complete at 14 Ft.	
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-231

LOG OF TEST PIT NO. TP-232

PROJECT: **West Windsor Residential Development**
PROJECT NO.: **31190147**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

GROUNDWATER ENCOUNTERED: **6 Ft.**
DATE STARTED: **2/18/2019**
GROUND SURFACE ELEVATION: **67 Ft.**
DATE COMPLETED: **2/18/2019**
DATUM: **TOPO**
CONTRACTOR: **Heritage Contracting Company, Inc.**
LOGGED BY: **JMM**
EQUIPMENT: **Caterpillar 308CR Excavator**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
66.0		SM		Dark brown, moist, Silty SAND	
	2				
	4				- Infiltration rate = 6 in/hr at 4 Ft.
62.5		SP		Dark yellow-brown, moist, Poorly-graded SAND with gravel	
	6			- Wet at 6 Ft.	
	8				
58.0				Test pit complete at 9 Ft. due to sidewall collapse.	
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

GEO-TECHNOLOGY ASSOCIATES, INC.

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LOG OF TEST PIT NO. TP-233

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **N/E**
GROUND SURFACE ELEVATION: **74 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
73.3				FILL - Dark brown, moist, silt with sand and gravel	
				- With concrete and asphalt fragments at 5 Ft.	- Perched water seepage at 7 Ft.
65.5		ML		Dark brown, moist, Sandy SILT	- Infiltration rate = 0 in/hr at 10 Ft.
61.0		SM		Dark yellow-brown, moist, Silty SAND	
60.0	14			Test pit complete at 14 Ft.	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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Somerset, NJ 08873

LOG OF TEST PIT NO. TP-233

LOG OF TEST PIT NO. TP-234

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **11 Ft.**
GROUND SURFACE ELEVATION: **71.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
70.5				FILL - Dark brown, moist, poorly-graded sand with silt and gravel	
	2				
	4				- Infiltration rate = 18 in/hr at 5 Ft.
65.5	6	SM		Dark yellow-brown, moist, Silty SAND with gravel and clay clods	
	8				
62.5		SP-SM		Light brown, moist, Poorly-graded SAND with silt	
	10				
				- Wet at 11 Ft.	
	12				
57.5	14			Test pit complete at 14 Ft.	
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-235

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

GROUNDWATER ENCOUNTERED: **12 Ft.**
GROUND SURFACE ELEVATION: **73 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
72.0				FILL - Dark brown, moist, sandy silt with debris (asphalt and concrete fragments)	
	2				
	4				
	6				- Infiltration rate = 0 in/hr at 6 Ft.
65.0	8	ML		Dark brown, moist, SILT with sand	
	10				
62.0		SP-SM		Dark brown, moist, Poorly-graded SAND with silt	
	12			- Wet at 12 Ft.	
60.0				Test pit complete at 13 Ft.	
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-235

LOG OF TEST PIT NO. TP-236

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **13.5 Ft.**
GROUND SURFACE ELEVATION: **73 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
72.0				FILL - Dark brown, moist, sandy silt with gravel and cobbles	- Infiltration rate = 0 in/hr at 5 Ft.
65.0	8	SC		Dark yellow-brown, moist, Clayey SAND	
62.0		SP		Dark yellow-brown, moist, Poorly-graded SAND with gravel - Wet at 13-1/2 Ft.	
59.0	14			Test pit complete at 14 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-237

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **9 Ft.**
GROUND SURFACE ELEVATION: **67 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
66.0		SM		Dark yellow-brown, moist, Silty SAND	
64.0		SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with gravel	- Infiltration rate = 36 in/hr at 4 Ft. - NMC = 10.6%
				- Wet at 9 Ft.	
56.0	11			Test pit complete at 11 Ft.	

NOTES: **Locations were staked by others.**
Backfilled On Completion.

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LOG OF TEST PIT NO. TP-238

PROJECT:	**West Windsor Residential Development**	PROJECT NO.:	**31190147**
PROJECT LOCATION:	**West Windsor, New Jersey**		
CLIENT:	**Bowman Consulting**		
		GROUNDWATER ENCOUNTERED:	**7.5 Ft.**
DATE STARTED:	**2/18/2019**	GROUND SURFACE ELEVATION:	**68.5 Ft.**
DATE COMPLETED:	**2/18/2019**	DATUM:	**TOPO**
CONTRACTOR:	**Heritage Contracting Company, Inc.**	LOGGED BY:	**JMM**
EQUIPMENT:	**Caterpillar 308CR Excavator**	CHECKED BY:	**AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
67.5		SM		Dark yellow-brown, moist, Silty SAND	
	2				
	4				
63.5		SP-SM		Yellow-brown, moist, Poorly-graded SAND with silt	
	6				- Infiltration rate = 13.5 in/hr at 5-1/2 Ft.
				- Wet at 7-1/2 Ft.	
	8				
58.5	10			Test pit complete at 10 Ft. due to sidewall collapse.	
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-239

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**
PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **72.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
71.8		SM		Dark yellow-brown, moist, Silty SAND	
70.0	2	SP-SM		Light yellow-brown, moist, Poorly-graded SAND with silt	- Infiltration rate = 6 in/hr at 3 Ft.
	4				
	6			- Wet at 7 Ft.	
	8				
63.5				Test pit complete at 9 Ft. due to sidewall collapse.	
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-239

LOG OF TEST PIT NO. TP-240

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/18/2019**
DATE COMPLETED: **2/18/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **8 Ft.**
GROUND SURFACE ELEVATION: **71.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
70.8		SM		Dark yellow-brown, moist, Silty SAND	
69.5	2	SP-SM		Dark yellow-brown, moist, Poorly-graded SAND with silt	
	4				
	6				- Infiltration rate = 15 in/hr at 5 Ft.
	8			- Wet at 8 Ft.	
62.5				Test pit complete at 9 Ft. due to sidewall collapse.	
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				

NOTES: **Locations were staked by others.**
Backfilled On Completion.

LOG OF TEST PIT NO. TP-241

PROJECT: **West Windsor Residential Development**
PROJECT LOCATION: **West Windsor, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31190147**

DATE STARTED: **2/15/2019**
DATE COMPLETED: **2/15/2019**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **Caterpillar 308CR Excavator**

GROUNDWATER ENCOUNTERED: **5.5 Ft.**
GROUND SURFACE ELEVATION: **69.5 Ft.**
DATUM: **TOPO**
LOGGED BY: **JMM**
CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
68.8		SM		Dark yellow-brown, moist, Silty SAND	
67.0	2	SP-SM		Yellow-brown, wet, Poorly-graded SAND with silt - Wet at 5-1/2 Ft.	- Infiltration rate = 1.5 in/hr at 3-1/2 Ft.
63.5	6	SC		Very dark green-gray, wet, Clayey SAND	
60.5		CL		Red-brown, wet, Sandy Lean CLAY	
58.5				Test pit complete at 11 Ft. due to sidewall collapse.	

Depth scale (ft.): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

NOTES: **Locations were staked by others.**
Backfilled On Completion.

APPENDIX C

Laboratory Data

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.1	1.0	10.7	72.0	15.2	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	0.4079	0.2804	0.2447	0.1811				

Material Description	USCS	AASHTO
○ Silty SAND	SM	A-2-4(0)

Project No. 31190147 **Client:** Bowman Consulting
Project: West Windsor Residential Development
○ **Source of Sample:** TP-201 **Depth:** 4

Date: ○

Remarks:
○NMC = 20.6%

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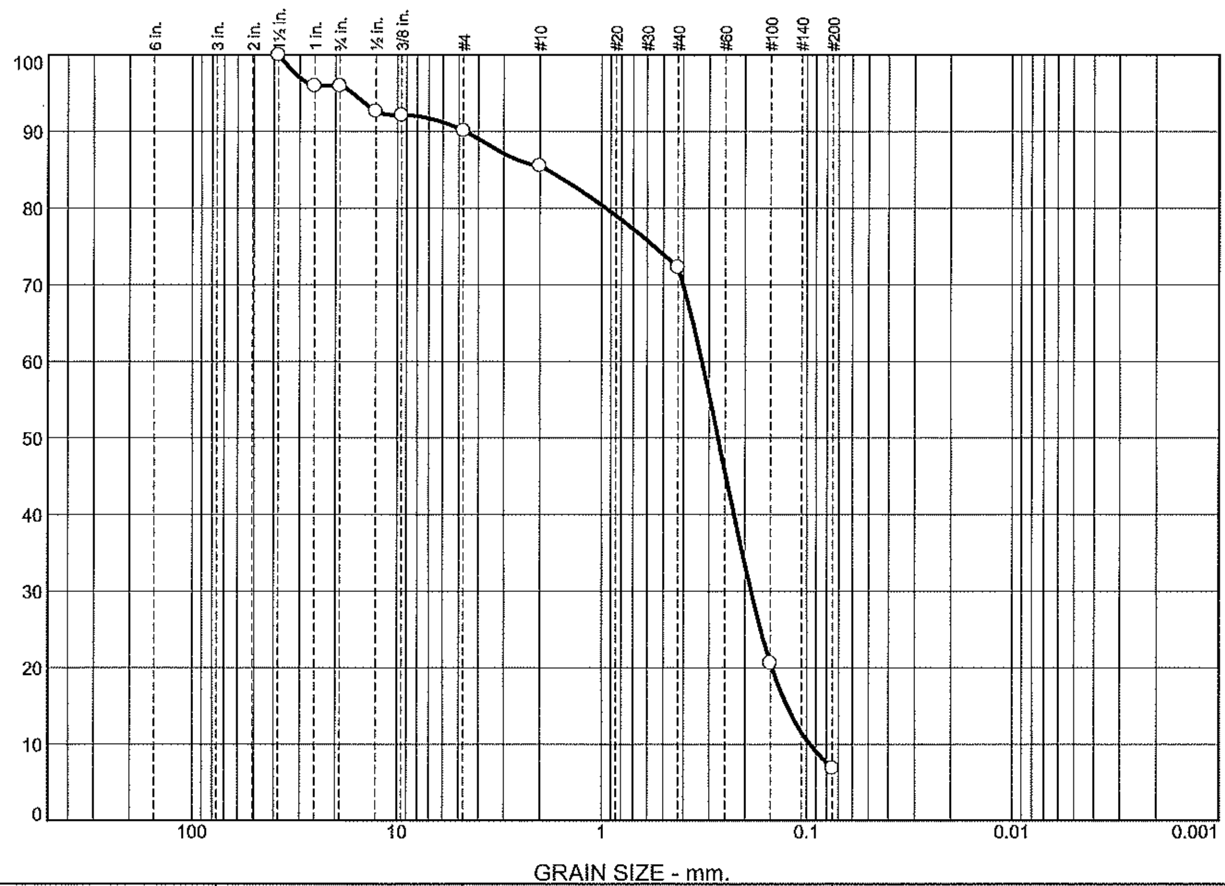
Somerset, NJ 08873

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	4.0	5.9	4.6	13.2	65.5	6.8	

X	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	1.8406	0.3255	0.2705	0.1864	0.1247	0.0963	1.11	3.38

Material Description	USCS	AASHTO
○ Poorly-graded SAND with silt	SP-SM	A-3

Project No. 31190147 **Client:** Bowman Consulting
Project: West Windsor Residential Development
○ **Source of Sample:** TP-205 **Depth:** 6.5

Date: ○

Remarks:
○NMC = 10.2%

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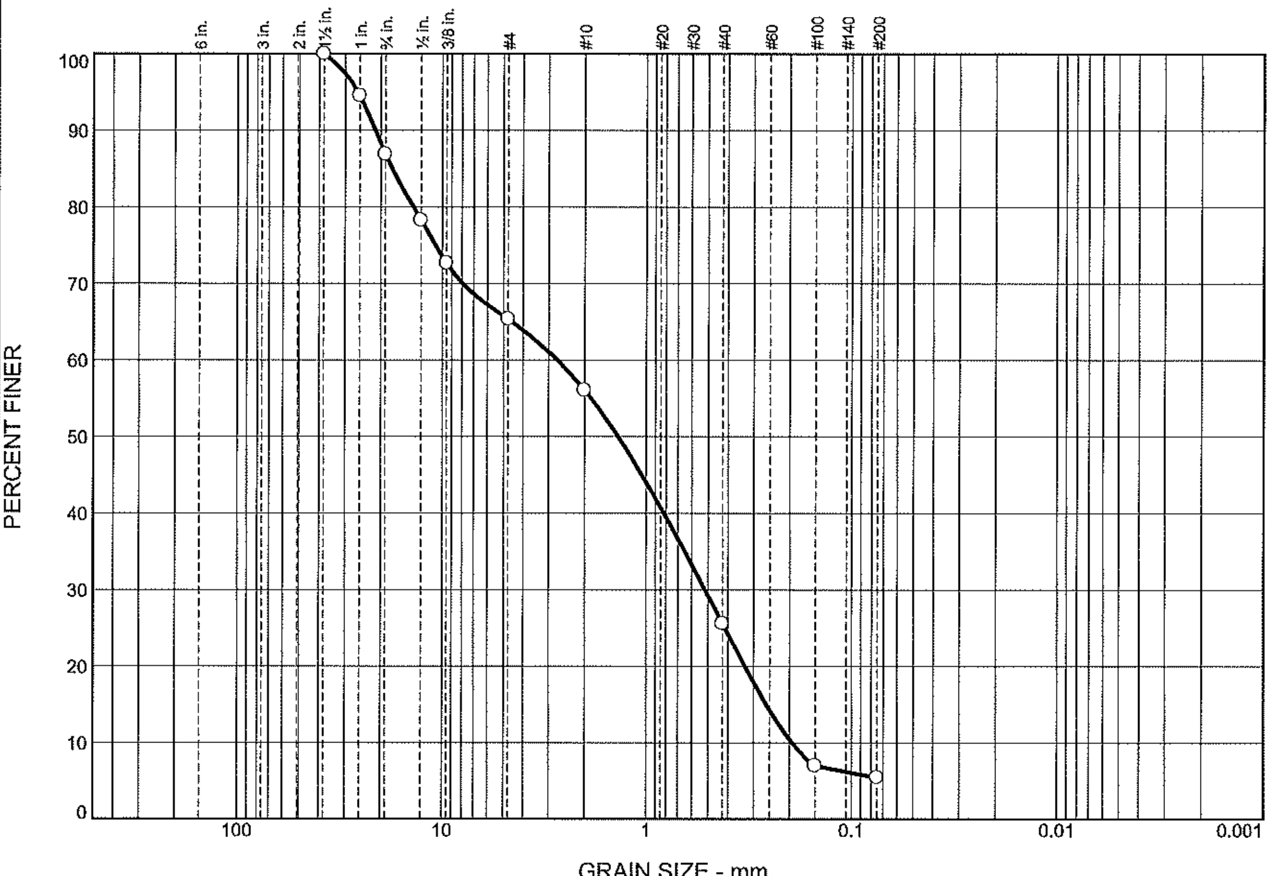
Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	13.1	21.6	9.2	30.5	20.2	5.4	

X	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	17.6447	2.7185	1.3726	0.5178	0.2597	0.1943	0.51	13.99

Material Description	USCS	AASHTO
○ Poorly-graded SAND with silt and gravel	SP-SM	A-1-b

Project No. 31190147 **Client:** Bowman Consulting

Project: West Windsor Residential Development

○ **Source of Sample:** TP-207 **Depth:** 12

Date: ○

Remarks:

○NMC = 27.7%

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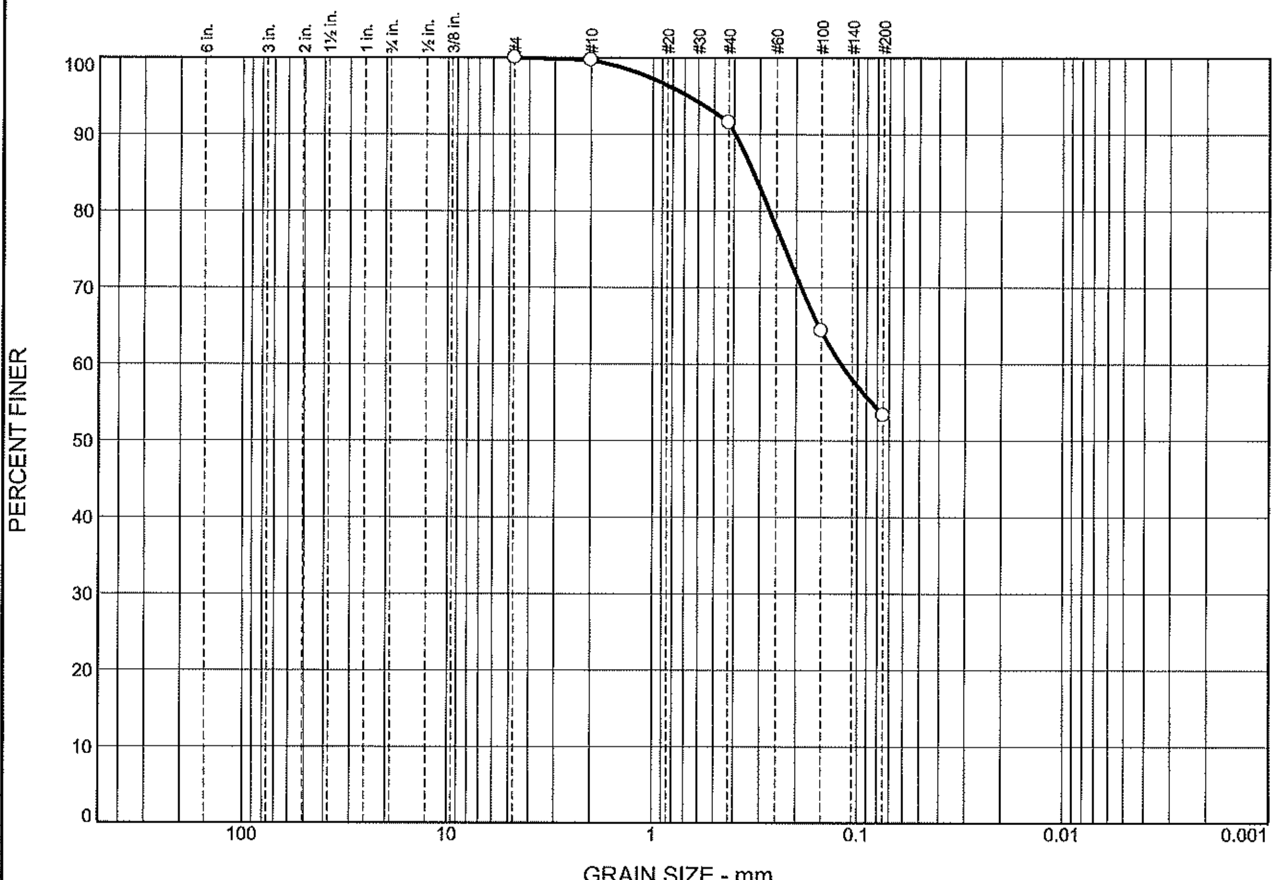
Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
○	0.0	0.0	0.0	0.3	8.1	38.3	53.3	

X	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		35.5	14.8	0.3221	0.1198						

Material Description	USCS	AASHTO
○ Sandy Lean CLAY	CL	A-6(7)

Project No. 31190147 **Client:** Bowman Consulting

Project: West Windsor Residential Development

○ **Source of Sample:** TP-214 **Depth:** 3.5

Date: ○

Remarks:

○NMC = 23.3%

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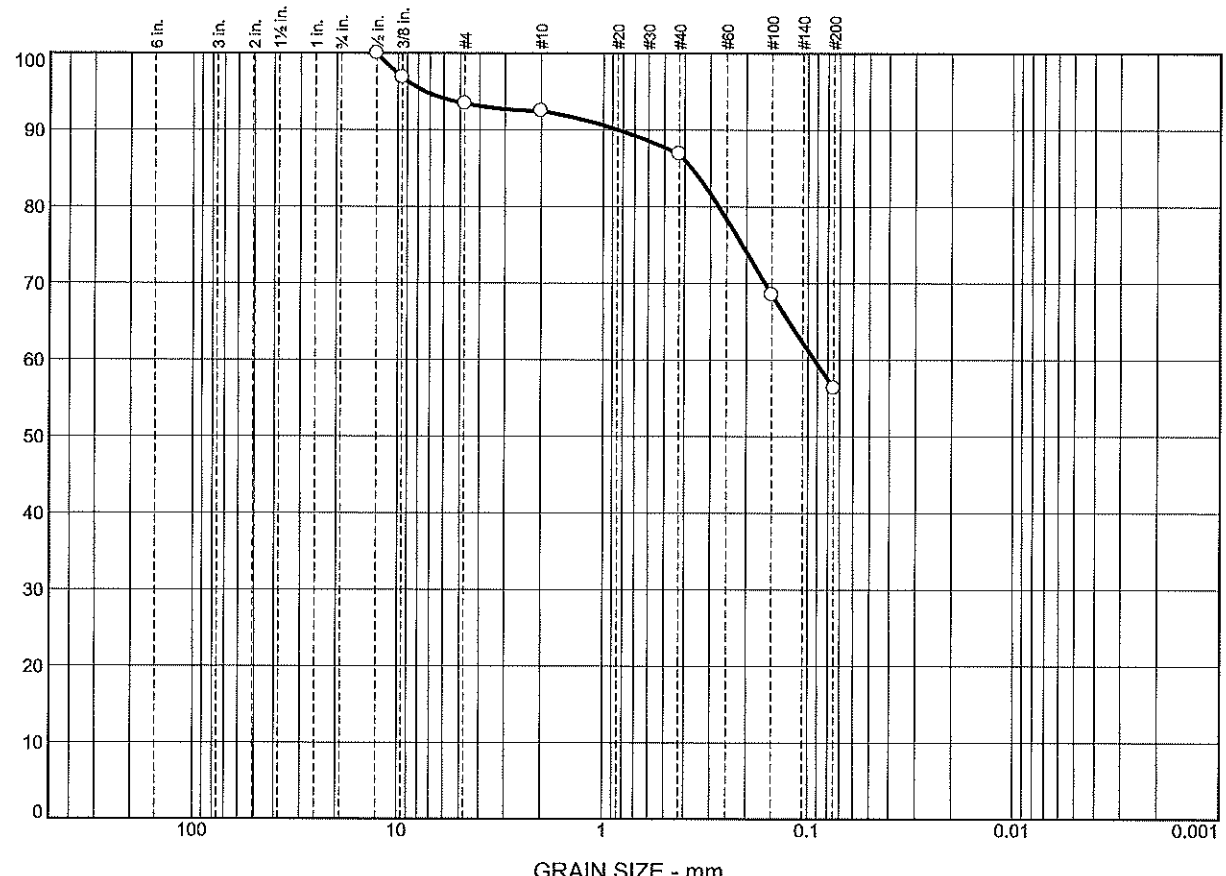
Somerset, NJ 08873

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	6.5	1.0	5.6	30.6	56.3	

X	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		19.6	14.7	0.3692	0.0929						

Material Description	USCS	AASHTO
○ Sandy Silty CLAY	CL-ML	A-4(0)

Project No. 31190147 **Client:** Bowman Consulting

Project: West Windsor Residential Development

○ **Source of Sample:** TP-218 **Depth:** 2

Date: ○

Remarks:

○NMC = 18.2%

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Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.8	3.6	8.8	31.2	45.6	

X	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		24.1	18.4	1.5912	0.1554	0.0936					

Material Description	USCS	AASHTO
○ Silty, Clayey SAND	SC-SM	A-4(0)

Project No. 31190147 **Client:** Bowman Consulting
Project: West Windsor Residential Development
○ **Source of Sample:** TP-222 **Depth:** 2

Date: ○

Remarks:
○NMC = 18.1%

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Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.4	1.7	15.3	78.8	2.8	

X	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	0.5416	0.3170	0.2816	0.2219	0.1805	0.1657	0.94	1.91

Material Description	USCS	AASHTO
○ Poorly-graded SAND	SP	A-3

Project No. 31190147 **Client:** Bowman Consulting
Project: West Windsor Residential Development
○ **Source of Sample:** TP-224 **Depth:** 4.5

Date: ○

Remarks:
○NMC = 22.5%

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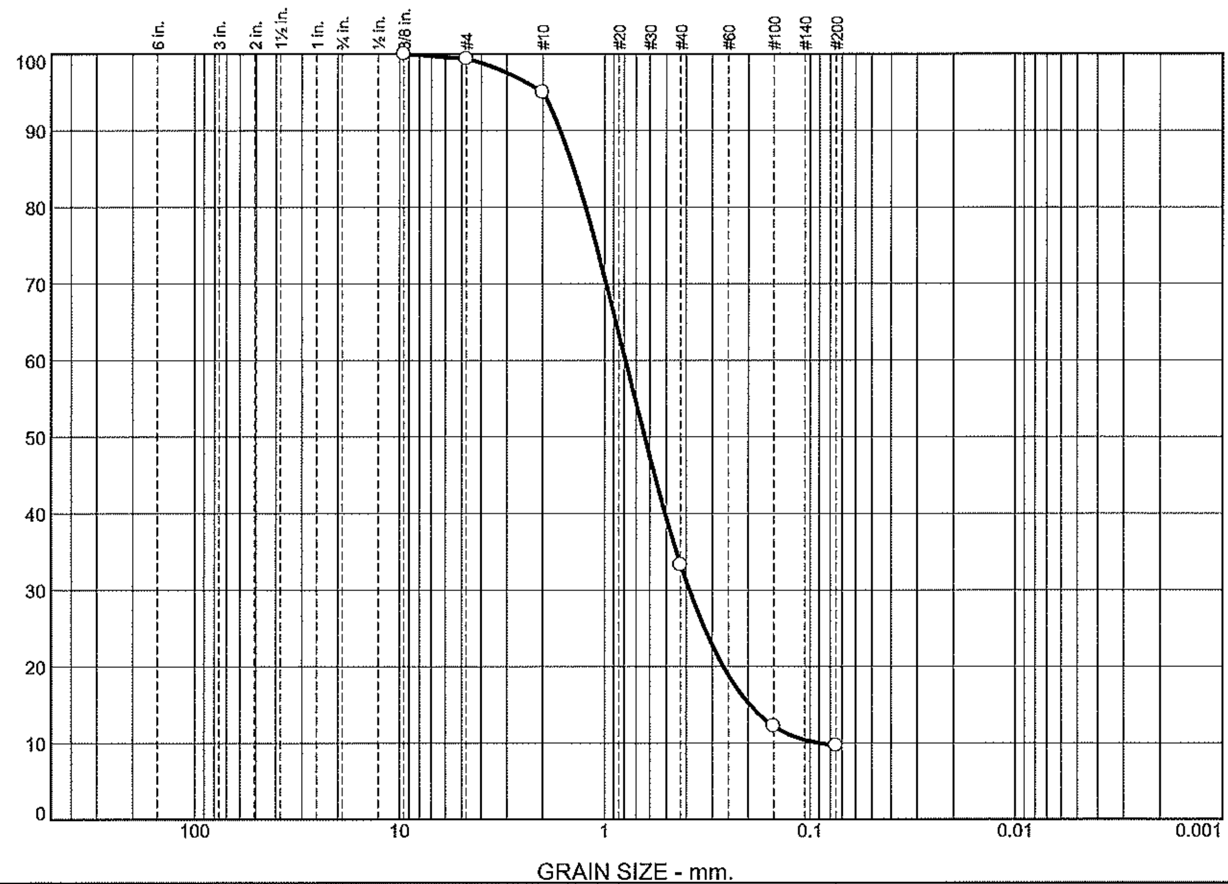
Somerset, NJ 08873

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.6	4.4	61.7	23.6	9.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	1.4109	0.7893	0.6359	0.3857	0.1959	0.0900	2.09	8.77

Material Description	USCS	AASHTO
○ Well-graded SAND with silt	SW-SM	A-1-b

Project No. 31190147 **Client:** Bowman Consulting

Project: West Windsor Residential Development

○ **Source of Sample:** TP-229 **Depth:** 3

Date: ○

Remarks:
○NMC = 17.6%

GTA
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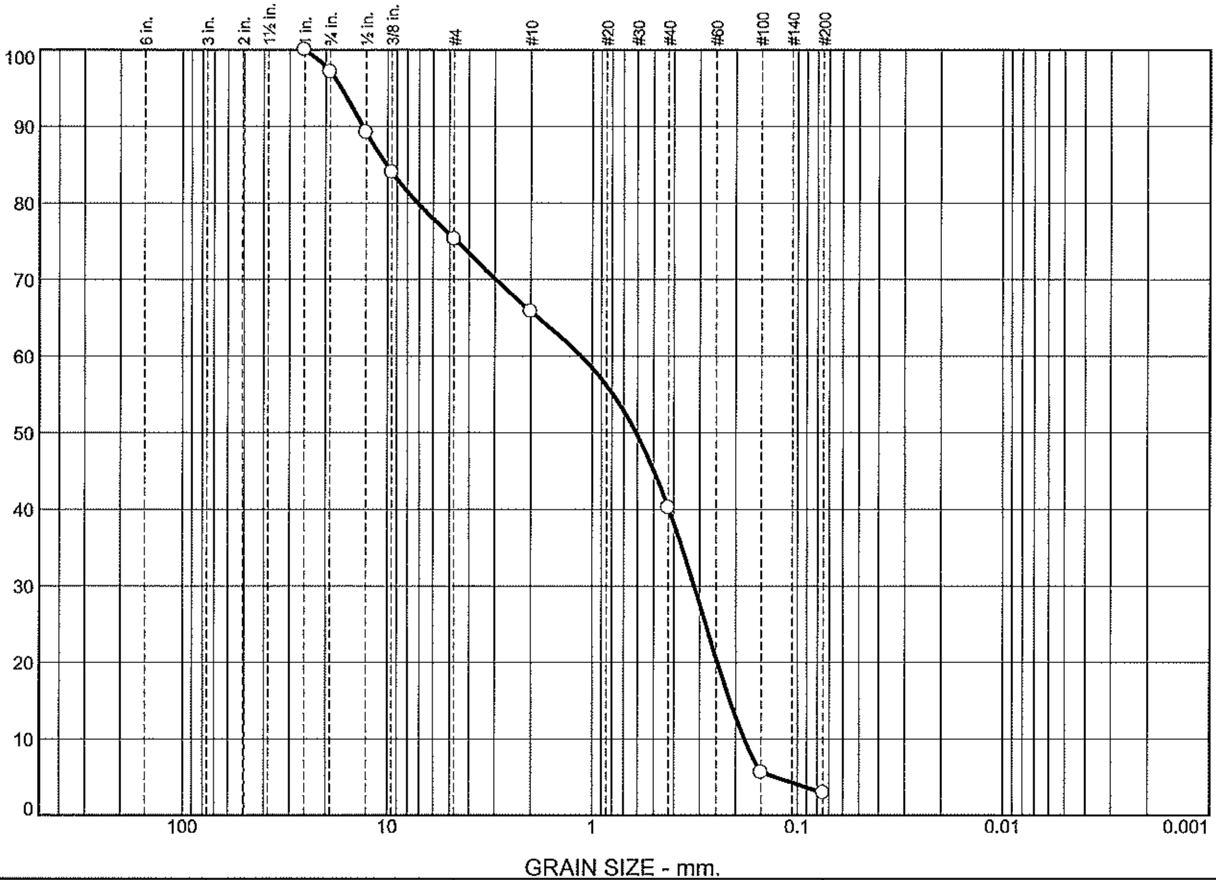
Somerset, NJ 08873

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	2.9	21.8	9.4	25.7	37.2	3.0	

╳	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	10.1133	1.1313	0.6102	0.3195	0.2132	0.1813	0.50	6.24

Material Description	USCS	AASHTO
○ Poorly-graded SAND with gravel	SP	A-1-b

Project No. 31190147 **Client:** Bowman Consulting

Project: West Windsor Residential Development

○ **Source of Sample:** TP-237 **Depth:** 6

Date: ○

Remarks:

○NMC = 10.6%

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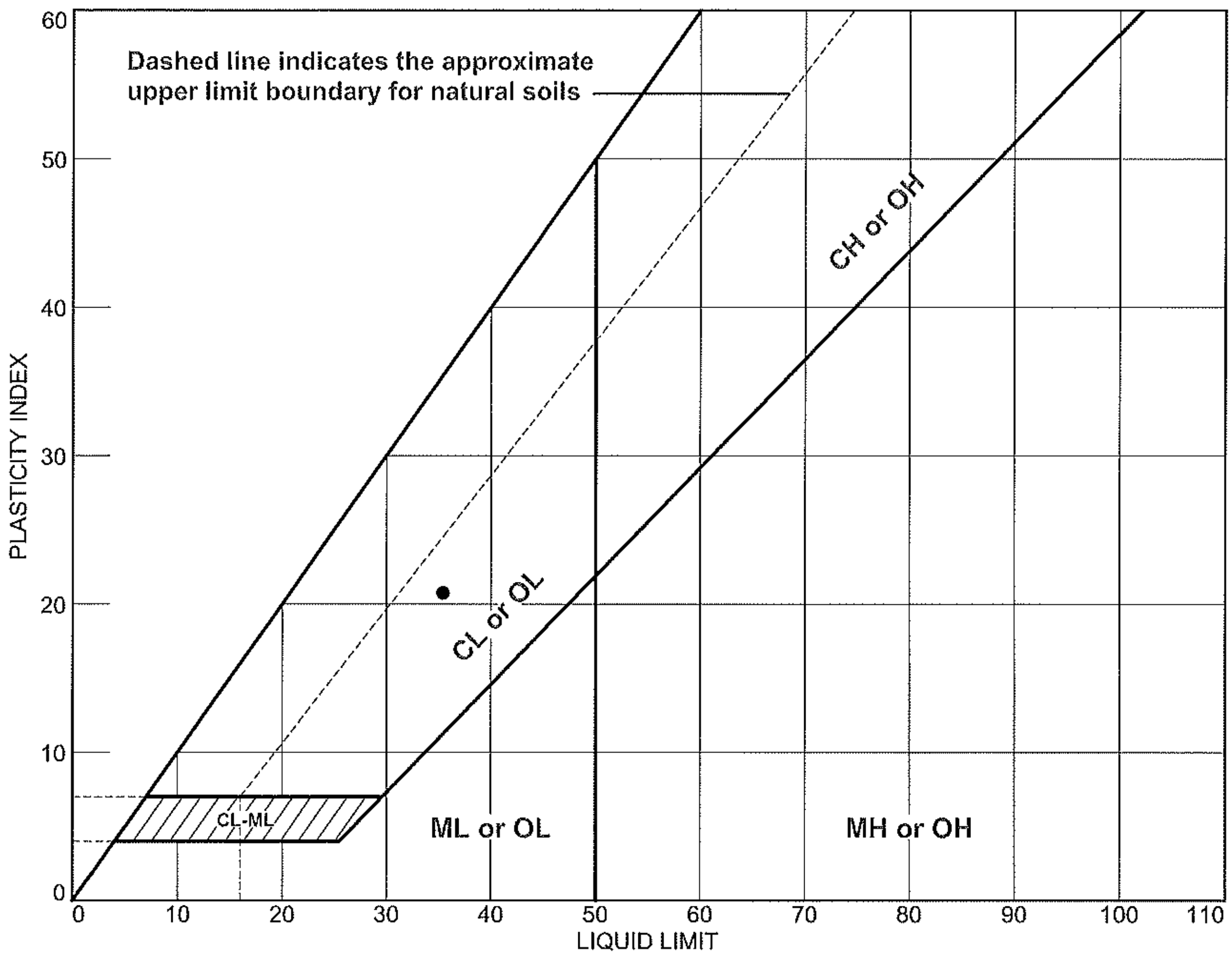
Somerset, NJ 08873

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	TP-214		3.5	23.3	14.8	35.5	20.7	CL

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

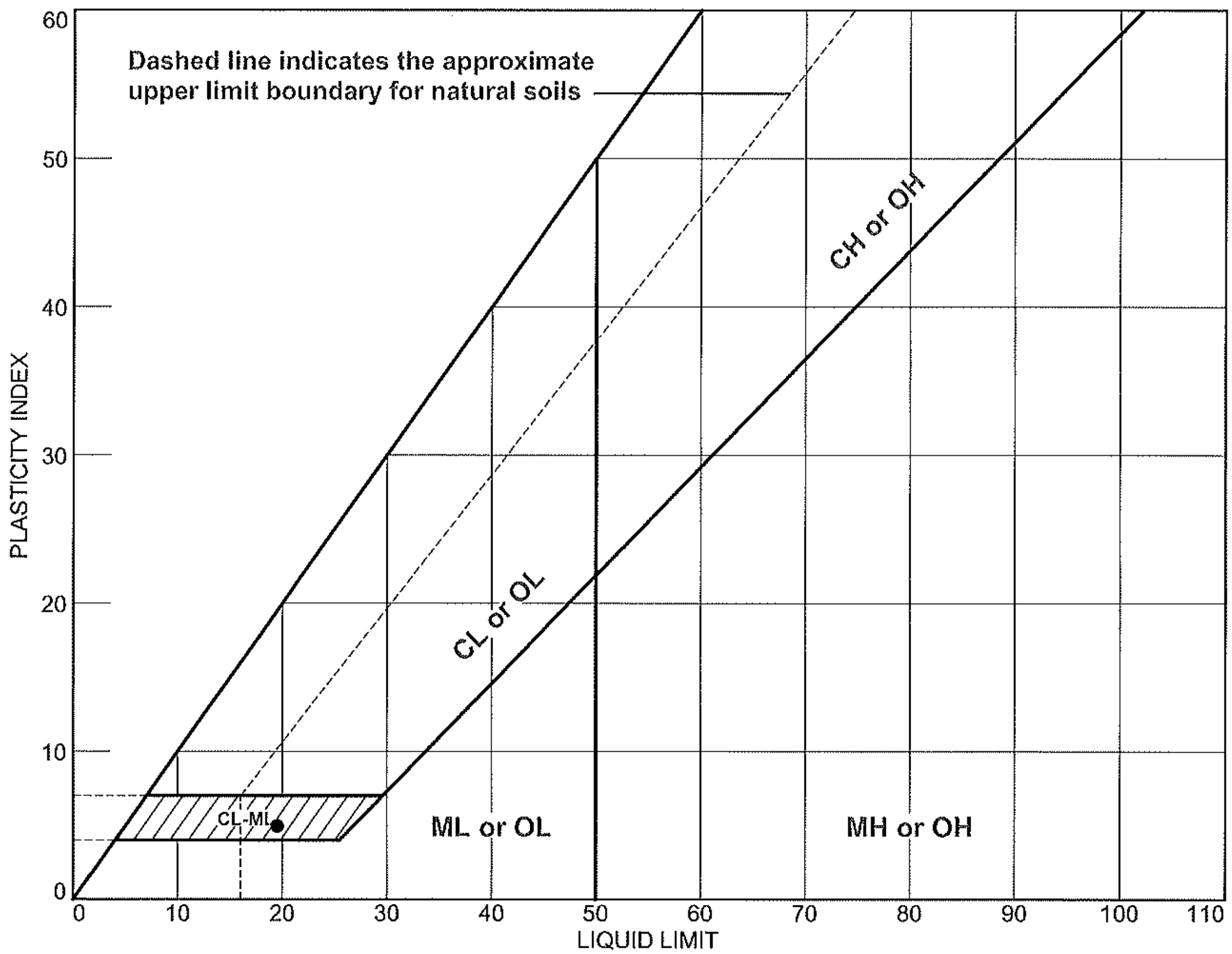
GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

Client: Bowman Consulting
Project: West Windsor Residential Development

Project No.: 31190147 **Figure**

Tested By: SB **Checked By:** AMT

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	TP-218		2	18.2	14.7	19.6	4.9	CL-ML

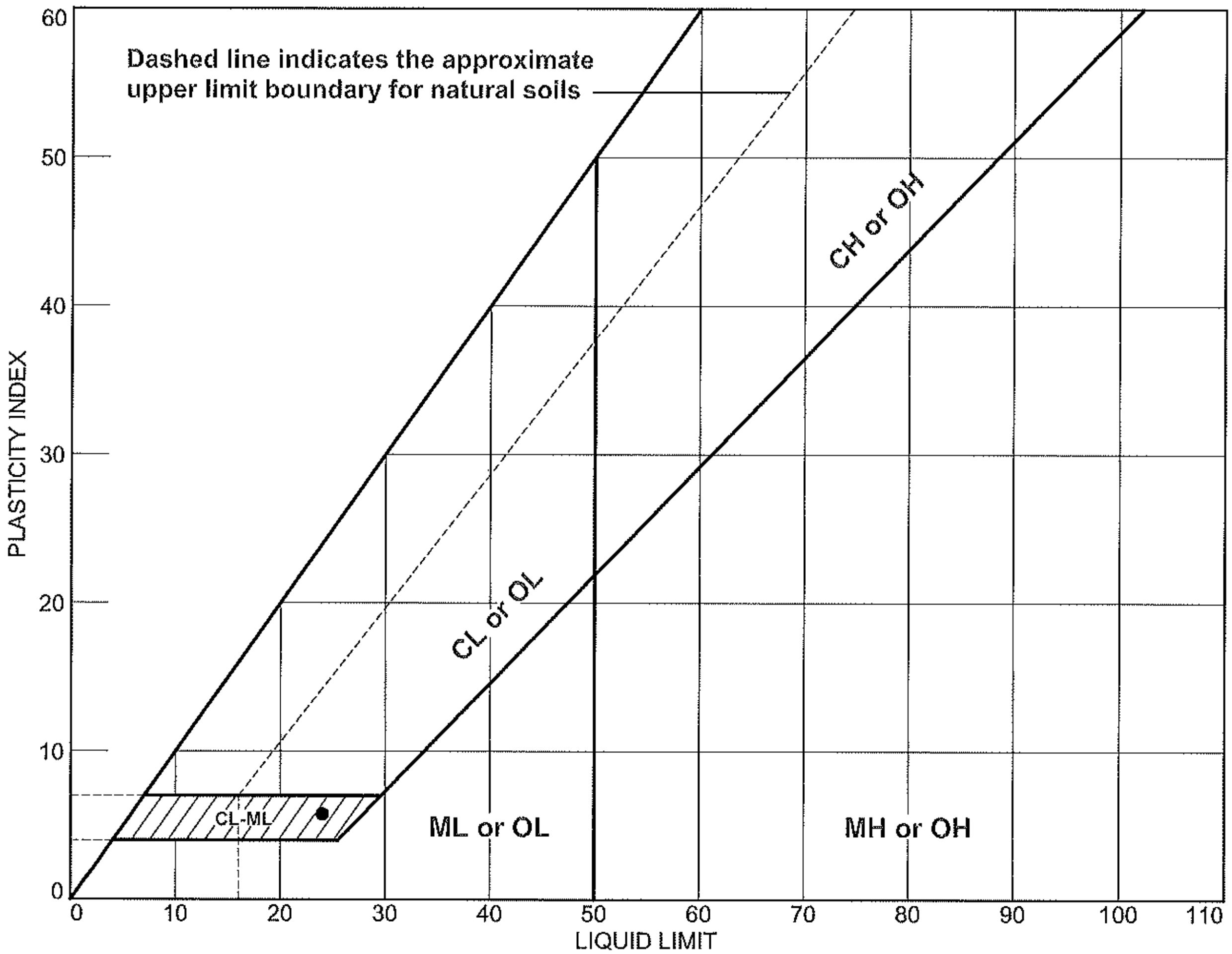
ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

Client: Bowman Consulting
Project: West Windsor Residential Development
Project No.: 31190147 **Figure**

Tested By: SB **Checked By:** AMT

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	TP-222		2	18.1	18.4	24.1	5.7	SC-SM

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite B
Somerset, NJ 08873

Client: Bowman Consulting
Project: West Windsor Residential Development
Project No.: 31190147 **Figure**

Tested By: SB **Checked By:** AMT

STORMWATER MANAGEMENT TESTING REPORT

West Windsor Hotel Site

West Windsor Township, Mercer County, New Jersey

December 2018

Prepared For:

BOWMAN CONSULTING
303 West Main Street, Suite 350
Freehold, New Jersey 07728

Attn: Mr. R. Michael McKenna, P.E., P.P.

Prepared By:

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
14 Worlds Fair Drive, Suite B
Somerset, New Jersey 08873

GTA Job No: 31180596x1

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

December 12, 2018

Bowman Consulting
303 West Main Street, Suite 350
Freehold, New Jersey 07728

Attn: Mr. R. Michael McKenna, P.E., P.P.

Re: Stormwater Management Testing Report
West Windsor Hotel Site
West Windsor Township, Mercer County, New Jersey

Dear Mr. McKenna:

In accordance with our agreement dated October 30, 2018, Geo-Technology Associates, Inc. (GTA) has performed subsurface explorations and testing for the planning and design of stormwater management (SWM) facilities related to proposed hotel and restaurant structures to be constructed in West Windsor Township, Mercer County, New Jersey. The exploration consisted of excavating 3 test pits with in-situ infiltration testing at the site, visually classifying the encountered soils, and performing limited laboratory testing. The results of the field and laboratory testing, and GTA's recommendations regarding the design and construction of the proposed SWM facilities are included in this report.

GTA appreciates the opportunity to have been of assistance to you on this project. Please contact our office at (732) 271-9301 if you have questions or require additional information.

Very truly yours,
GEO-TECHNOLOGY ASSOCIATES, INC.

Allison Tether

Allison Tether, P.G.
Geotechnical Project Manager

Dennis C. Loh, P.E.
Vice President

AMT/DCL: at
Job No. 31180596x1
Attachments

TABLE OF CONTENTS

STORMWATER MANAGEMENT TESTING REPORT

WEST WINDSOR HOTEL SITE
WEST WINDSOR TOWNSHIP
MERCER COUNTY, NEW JERSEY
DECEMBER 2018

INTRODUCTION

This report presents the results of subsurface explorations and in-situ infiltration testing performed by Geo-Technology Associates, Inc. (GTA) for the planning and design of stormwater management (SWM) facilities related proposed hotel and restaurant structures to be constructed in West Windsor Township, Mercer County, New Jersey. The subject site is located southeast of the proposed structures, adjacently east of the intersection of Meadow Road and the on-ramp to U.S. Route 1 north, and presently consists of agricultural fields with some wooded areas. Please refer to the Site Location Map, which is Figure 1 in Appendix A of this report.

GTA was provided with an untitled plan prepared by Bowman Consulting dated October 29, 2018. The plan indicates the existing topography, the locations of the proposed hotel and restaurant structures in the northern part of the site, proposed storm and sewer lines that will service the structure, and a proposed SWM basin located in the southern portion of the site. The plan also indicates the locations of 3 requested test pits with infiltration testing.

According to Appendix E of the NJ Stormwater BMP Manual, test pits and infiltration tests must be performed within each SWM infiltration basin location. At least two test pits and infiltration tests must be performed for basins with an infiltration area of up to 10,000 square feet, and one additional test must be performed for each additional 10,000 square feet of infiltration area. Infiltration tests must be performed at the level of infiltration or deeper if hydraulically restrictive soils are present within 8 feet of the proposed basin bottom level. Therefore, the test pits must extend at least 8 feet below the planned level of infiltration.

SITE CONDITIONS

The site is bounded by Meadow Road to the south, the on-ramp to U.S. Route 1 north to the west, and borders agricultural land to the east and north, with some wooded areas present to the northwest. At the time of our study, the site contained agricultural land, and trees were present along Meadow Road and the U.S. Route 1 on-ramp.

Based on our visual observations and review of the ground surface topography shown on the plan provided to us, the existing surface grades in the proposed basin area generally slope gently downward from about Elevation (EL) 73.5 feet in the northwest to about EL 70 feet in the southeast.

PROPOSED SWM BASIN CONSTRUCTION

The conceptual plan provided to us indicates a proposed SWM basin will be located southeast of the proposed hotel and restaurant structures, in the portion of the site roughly bounded by Meadow Road and the on-ramp to U.S. Route 1 north. The square footage of the basin was not indicated on the plan provided to us; however, based on the scale provided we determined the area of the basin to be roughly 17,000 square feet. The plan indicates the bottom of the infiltration basin will be established at about EL 70 feet and the emergency spillway will be at about EL 72 to EL 73 feet. Cuts and fills of up to about 3 feet from the existing surface graces will be required to achieve the planned infiltration and embankment grades, respectively.

SITE GEOLOGY

The subject site is situated within the Piedmont physiographic province characterized by a low rolling plain divided by a series of higher ridges and predominantly underlain by sedimentary rocks of Triassic and Jurassic age. The site is underlain by the Stockton Formation of the Upper Triassic Period of the Mesozoic Era, as shown on the *Bedrock Geologic Map of the Princeton Quadrangle, Mercer and Middlesex Counties, New Jersey (OFM 93, 2012)* published by the New Jersey Geological and Water Survey. This formation is described as an interbedded sequence of gray, grayish-brown, or slightly reddish-brown, medium- to fine-grained, thin- to thick-bedded, conglomerate and arkosic sandstone, and reddish-brown clayey fine-grained sandstone, siltstone, and mudstone. Fining upward sequences are common, and the coarser units commonly occur as lenses. The unit is approximately 4,500 feet in thickness.

According to the *Surficial Geology of New Jersey (DGS07-2, 2013)* published as part of the Digital Geodata Series by the New Jersey Geological and Water Society, generated using data from the United States Geological Survey, the surficial geology of the site is mapped as Eolian Deposits. The soils are described as very pale brown and yellow-brown windblown fine sand and silt. The unit can be as much as 15 feet thick.

Please refer to the referenced publications for more detailed descriptions of the geologic members.

SUBSURFACE EXPLORATION

The subsurface exploration program consisted of excavating a total of 3 test pits within the potential basin location. The test pits were excavated by Heritage Contracting Company, Inc. on November 11, 2018 using a John Deere 410G backhoe, and extended to depths of approximately 10 to 12 feet below the existing surface grades. The exploration locations were selected and staked by Bowman Consulting prior to our exploration. In-situ infiltration tests were performed adjacent to each of the 3 test pits at depths ranging from about 1½ to 4½ feet below the ground surface.

The approximate locations of the explorations performed for this study are shown on the Test Pit Location Plan, which is included as Figure 2 in Appendix A. Detailed descriptions of the encountered subsurface conditions are indicated on the Logs of Test Pits, which are presented in Appendix B. The ground surface elevations indicated on the exploration logs were obtained by interpolation between topographic contours shown on the plans, and should be considered approximate.

Soil samples obtained from the test pits were brought to GTA's laboratory for visual classification by a geotechnical engineer and limited laboratory testing. The soil descriptions shown on the logs are therefore based on visual observation of the samples, supplemented by the laboratory results.

LABORATORY TESTING

Laboratory testing performed for this study included grain-size testing for classification of the soils in accordance with the Unified Soil Classification System (USCS), and natural moisture content determinations. Detailed results of the laboratory testing performed for this study are included in Appendix C. The results of the testing are summarized in the following table:

SUMMARY OF LABORATORY TESTING

Test Pit Location	Depth (Ft)	USCS Classification	NMC (%)
TP-1	4-5	Poorly-graded SAND with silt (SP-SM)	17.2
TP-2	1.5-2.5	SILT with sand (ML)	20.4
TP-3	5-6	Poorly-graded SAND with silt (SP-SM)	11.6

Note: NMC=Natural Moisture Content

SUBSURFACE CONDITIONS

An approximately 10- to 11-inch thick layer of topsoil was encountered at the ground surface in the test pits performed for this study. The natural soils encountered below the topsoil appear to be consistent with the geologic mapping, and generally consisted of silts with sand and gravel to depths of about 3½ to 4½ feet, overlying poorly-graded sands with silt to the completion depths of the test pits.

Groundwater was encountered in the test pits at depths ranging from about 6 to 7½ feet below the ground surface, corresponding to about EL 65 feet. Long-term groundwater readings were not obtained because the test pits were backfilled upon completion for safety considerations. Fluctuations in the groundwater level typically occur due to several factors, including variations in precipitation, seasonal changes, and site development activities. Soil mottling indicative of the seasonal high groundwater level was not observed in the test pits; however, we believe the seasonal high groundwater level generally corresponds to the groundwater level encountered in the explorations.

INFILTRATION TEST RESULTS

In-situ infiltration tests were performed adjacent to each of the test pits performed for this study using a double-ring infiltrometer in accordance with the ASTM D 3385 test procedure. The tests were performed at depths of approximately 1½ to 4½ feet below the ground surface within the natural soils. The results of the infiltration tests performed for this study are summarized in the following table:

SUMMARY OF INFILTRATION TEST RESULTS

Test Pit Location	Approximate Test Depth* (ft)	Final Water Level Drop (in)	Time Interval (min)	USCS Classification	Measured Infiltration Rate (in/hr)
TP-1	2	0	20	SILT with sand (ML)	0
TP-1	4½	1½	5	Poorly-graded SAND with silt (SP-SM)	18
TP-2	1½	¼	15	SILT with sand (ML)	1
TP-3	4	¾	5	Poorly-graded SAND with silt (SP-SM)	9

*Beneath the existing ground surface.

A factor of safety of at least 2 should be applied to the measured infiltration rates.

CONCLUSIONS AND RECOMMENDATIONS

The primary conditions that affect the capacity to infiltrate water are the soil gradation and density properties and the presence of hydraulically restrictive layers such as silt or clay (fines), rock, or groundwater, each of which would restrict the flow of water into the underlying aquifer. The soil profile generally consisted of fine-grained silts overlying poorly-graded sands. Groundwater was encountered in the test pits at depths ranging from about 6 to 7½ feet below the ground surface. In general, the fine-grained silts (ML) were not receptive to infiltration, and the coarse-grained sands (SP-SM) appeared receptive to infiltration.

We believe the infiltration test results and groundwater observations indicate that infiltration of collected stormwater is generally feasible at the basin location within the deeper poorly-graded sand layer. However, it appears that fine-grained soils will be present at the planned basin subgrade level. Therefore, it will be necessary to excavate and replace the upper silty soils to expose the more permeable granular soils. We recommend additional testing be performed at the time of construction to verify the design assumptions. This testing should be performed after the basin subgrades are properly prepared.

It appears that the excavation to remove the shallow fine-grained soils will extend top depths of about 1 to 3½ feet below the planned basin bottom level of EL 70 feet. The undercut should expose the underlying more permeable poorly-graded sand with silt soils throughout the proposed area of infiltration. The overexcavation should then be backfilled to the proposed bottom of basin elevation using granular soils, washed gravel, or sand meeting the design infiltration rate or faster.

It will be important to limit disturbance and compaction of the infiltration surface during construction. Infiltration areas should not be exposed to unstabilized runoff that may contribute to sedimentation and clogging of the subgrade, and possible system failure, prior to the completion of construction. Where possible, the operation of heavy construction equipment directly on the infiltration area subgrades should be avoided or kept to a minimum. After grubbing and rough grading, infiltration areas should be tilled with a disc or rotary tiller followed by a leveling drag, to restore the soils to a loose condition.

Construction oversight by competent engineering personnel during installation of stormwater management facilities is critical to successful functioning of the system. Ideally, construction oversight should be provided by the geotechnical engineer, or qualified representative, retained by the project owner to document construction operations and assure that project specifications and special construction requirements are met. Periodic inspection and maintenance of the infiltration system will be required to maximize the efficiency and design life of the system.

ADDITIONAL SERVICES

We recommended that GTA be retained during construction of the subject project to provide geotechnical consultation and construction observation and testing services as outlined below:

- Provide on-site observation during SWM basin construction.
- Perform infiltration testing at the time of construction after the basin subgrade has been properly prepared.

LIMITATIONS

This report, including all supporting test pit logs, field data, field notes, laboratory test data, calculations, estimates and other documents prepared by GTA in connection with this project have been prepared for the exclusive use of Bowman Consulting (Client) pursuant to the Agreement between GTA and Client dated October 30, 2018, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Client is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Test pits indicate soil conditions only at specific locations and times, and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between test pit locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of GTA.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client.

This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

31180596x1 **GEO-TECHNOLOGY ASSOCIATES, INC.**

Important Information about Your

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your GBA-Member Geotechncial Engineer for Additional Assistance

Membership in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontaton techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.

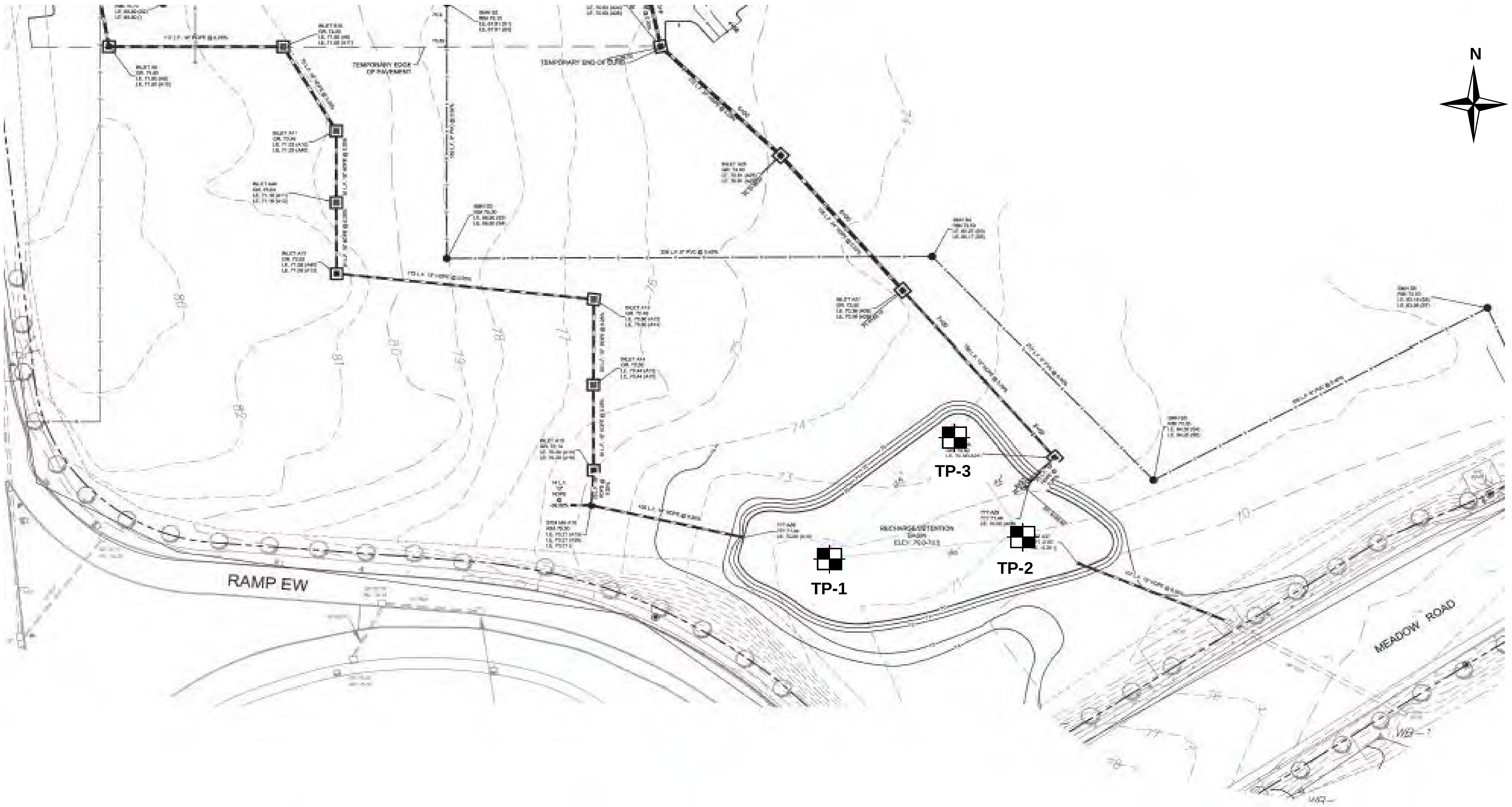
GEOPROFESSIONAL
BUSINESS
ASSOCIATION

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX A

Figures

FIGURE 1: SITE LOCATION MAP	***WEST WINDSOR HOTEL SITE***
14 Worlds Fair Drive, Suite B Somerset, New Jersey 08873 (732) 271-9301 fax (732) 271-9306	West Windsor Township, Mercer County, New Jersey Prepared For: Bowman Consulting
GEO-TECHNOLOGY ASSOCIATES, INC.	SOURCE: Google Map SCALE: NTS · DATE: JUN. 2018 · PROJECT #: 31180596x1



*Base plan provided by Bowman Consulting dated October 29, 2018.

LEGEND:

TP-X

Indicates the numbers and approximate locations of test pits performed for this study.

TEST PIT LOCATION PLAN

WEST WINDSOR HOTEL SITE

West Windsor Township,
Mercer County, New Jersey

Prepared For: Bowman Consulting

14 Worlds Fair Drive, Suite B
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

DESIGN BY: *	DRAWN BY: AMT	REVIEWED BY: DCL
SCALE: NTS	DATE: NOV. 2018	PROJECT #: 31180596x1

Figure 2

APPENDIX B

Exploration Logs

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50		ML
					CL
					OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50		MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	
UPON COMPLETION OF DRILLING	
24 HOURS AFTER COMPLETION	

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF TEST PIT NO. TP-1 (Stake 1003)

PROJECT: **West Windsor Hotel Site**
PROJECT LOCATION: **West Windsor Township, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31180596x1**

DATE STARTED: **11/12/18**
DATE COMPLETED: **11/12/18**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **John Deere 410G Backhoe**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **72 Ft.**
DATUM: **TOPO**
LOGGED BY: **AMT**
CHECKED BY: **DCL**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			10 In. of Topsoil	
71.2		ML		Dark yellow-brown (10YR 4/6), moist, SILT with sand and gravel	- Infiltration rate = 0 in/hr at 2 Ft.
68.5	5	SP-SM		Light yellow-brown (2.5Y 6/4), moist, Poorly-graded SAND with silt - wet at 7 Ft. - Brown (10YR 5/3) at 8 Ft.	- NMC = 17.2% - Infiltration rate = 18 in/hr at 4-1/2 Ft. - Rapid water seepage at 7 Ft. - Sidewall collapses at 7, 8 and 10 Ft.
62.0	10			Test pit complete at 10 Ft.	
	15				
	20				
	25				
	30				

NOTES: **Locations were staked by others.**
Backfilled on completion.

LOG OF TEST PIT NO. TP-2 (Stake 1004)

PROJECT: **West Windsor Hotel Site**
PROJECT LOCATION: **West Windsor Township, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31180596x1**

DATE STARTED: **11/12/18**
DATE COMPLETED: **11/12/18**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **John Deere 410G Backhoe**

GROUNDWATER ENCOUNTERED: **6 Ft.**
GROUND SURFACE ELEVATION: **71 Ft.**
DATUM: **TOPO**
LOGGED BY: **AMT**
CHECKED BY: **DCL**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			11 In. of Topsoil	
70.1		ML		Dark yellow-brown (10YR 4/6), moist, SILT with sand and gravel	- NMC = 20.4% - Infiltration rate = 1 in/hr at 1-1/2 Ft.
66.5	5	SP-SM		Light yellow-brown (2.5Y 6/4), moist, Poorly-graded SAND with silt - wet at 6 Ft.	- Rapid water seepage at 6 Ft. - Sidewall collapses at 7, 8 and 9 Ft.
61.0	10			Test pit complete at 10 Ft.	
	15				
	20				
	25				
	30				

NOTES: **Locations were staked by others.**
Backfilled on completion.

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Somerset, NJ 08873

LOG OF TEST PIT NO. TP-2 (Stake 1004)

LOG OF TEST PIT NO. TP-3 (Stake 1005)

PROJECT: **West Windsor Hotel Site**
PROJECT LOCATION: **West Windsor Township, New Jersey**
CLIENT: **Bowman Consulting**

PROJECT NO.: **31180596x1**

DATE STARTED: **11/12/18**
DATE COMPLETED: **11/12/18**
CONTRACTOR: **Heritage Contracting Company, Inc.**
EQUIPMENT: **John Deere 410G Backhoe**

GROUNDWATER ENCOUNTERED: **7.5 Ft.**
GROUND SURFACE ELEVATION: **73 Ft.**
DATUM: **TOPO**
LOGGED BY: **AMT**
CHECKED BY: **DCL**

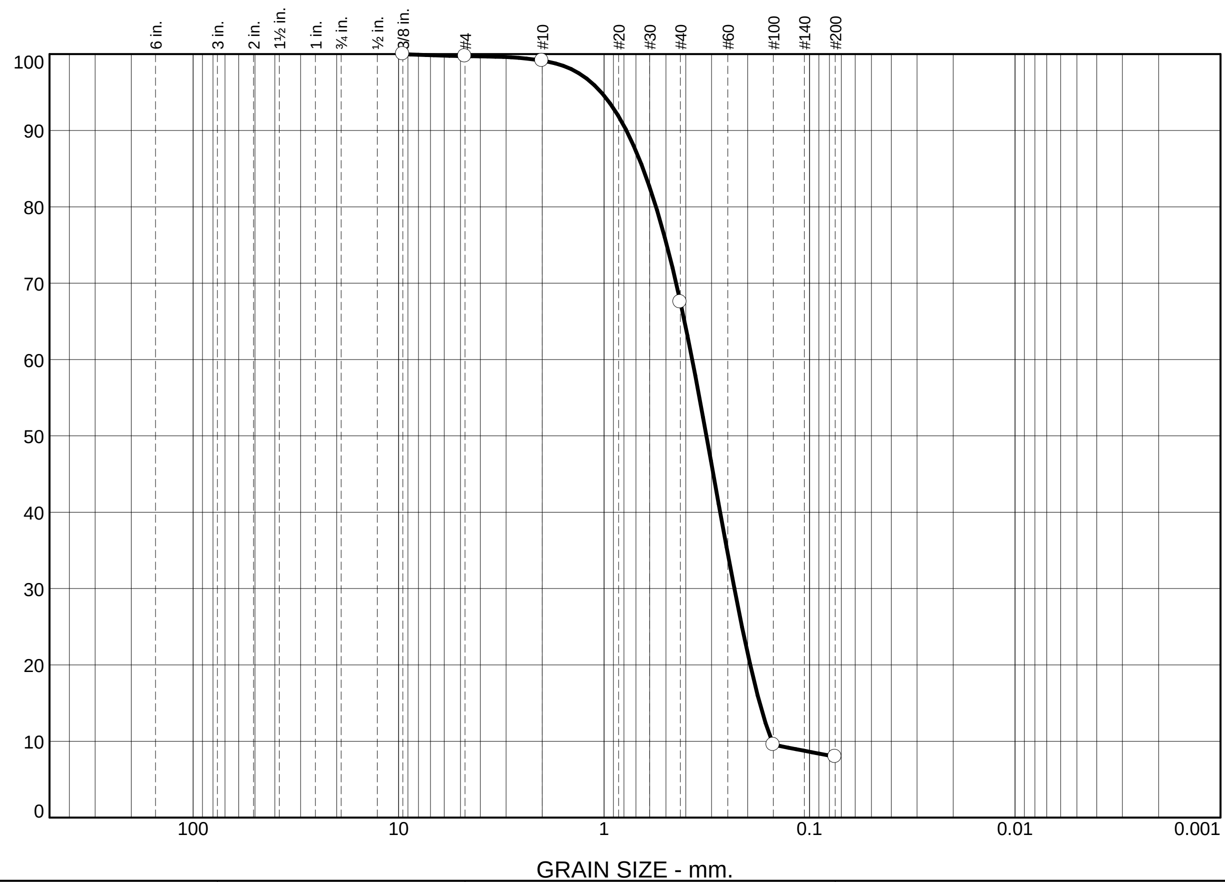
ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			11 In. of Topsoil	
72.1		ML		Dark yellow-brown (10YR 4/6), moist, SILT with sand and gravel	
69.0	5	SP-SM		Light yellow-brown (2.5Y 6/4), moist, Poorly-graded SAND with silt - wet at 7-1/2 Ft. - Yellow-brown (10YR 5/4) at 8 Ft.	- Infiltration rate = 9 in/hr at 4 Ft. - NMC = 11.6% - Rapid water seepage at 7-1/2 Ft. - Sidewall collapses at 7, 8, 10 and 12 Ft.
61.0	10			Test pit complete at 12 Ft.	
	15				
	20				
	25				
	30				

NOTES: **Locations were staked by others.**
Backfilled on completion.

APPENDIX C

Laboratory Data

Particle Size Distribution Report



% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	0.3	0.6	31.6	59.5	8.0	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
	NP	NP	0.6463	0.3725	0.3175	0.2321	0.1748	0.1524	0.95	2.44

Material Description	USCS	AASHTO
Poorly-graded SAND with silt	SP-SM	A-3

Project No. 31180596x1 **Client:** Bowman Consulting

Project: West Windsor Hotel Site

Source of Sample: TP-1 (Stake 1003) **Depth:** 4

Date:

Remarks:

NMC = 17.2%

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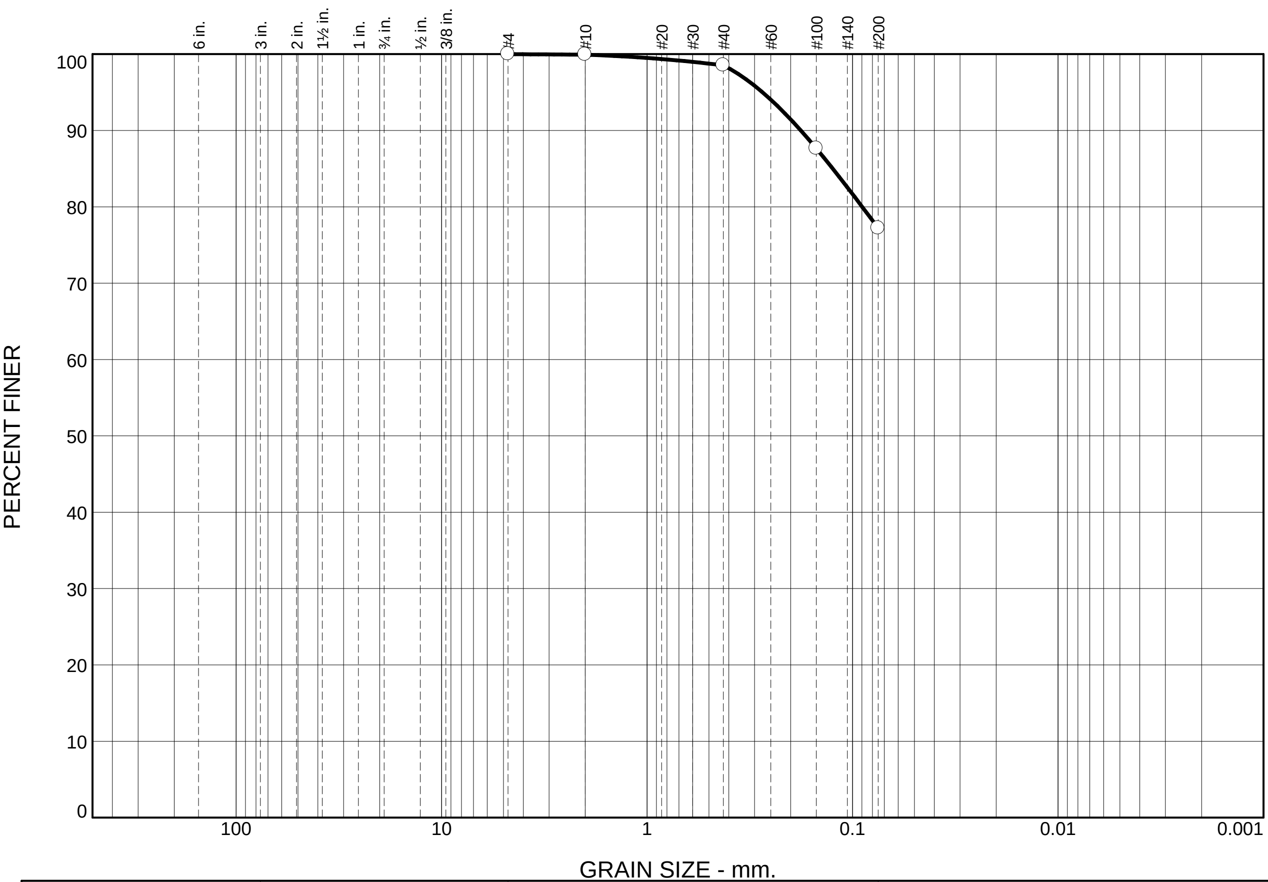
Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
○	0.0	0.0	0.0	0.1	1.4	21.3	77.2	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	0.1248							

Material Description	USCS	AASHTO
○ SILT with sand	ML	A-4(0)

Project No. 31180596x1 **Client:** Bowman Consulting

Project: West Windsor Hotel Site

○ **Source of Sample:** TP-2 (Stake 1004) **Depth:** 1.5

Date: ○

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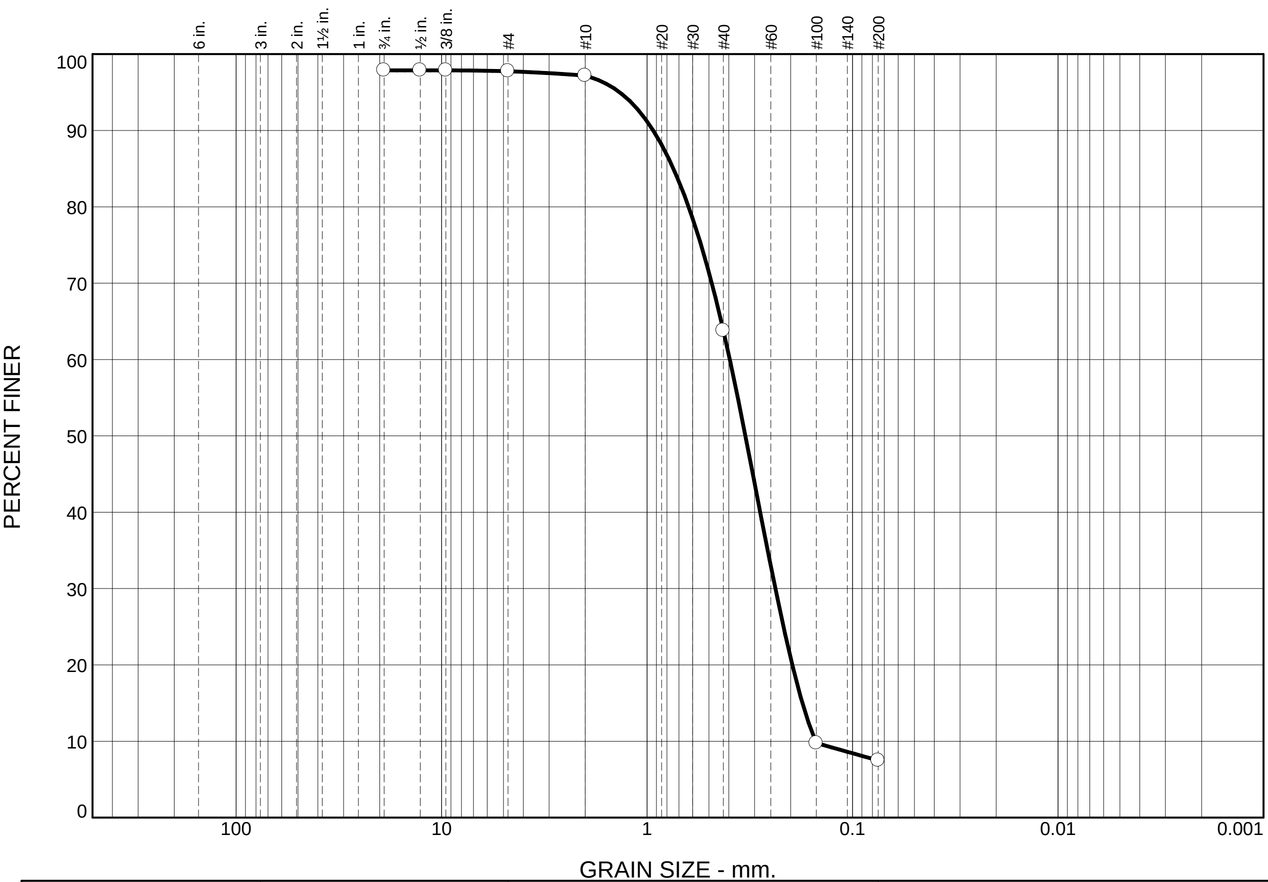
Remarks:
○NMC = 20.4%

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○			0.1	0.6	33.4	56.3	7.5	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	NP	0.7446	0.3955	0.3322	0.2374	0.1754	0.1514	0.94	2.61

Material Description	USCS	AASHTO
○ Poorly-graded SAND with silt	SP-SM	A-3

Project No. 31180596x1 **Client:** Bowman Consulting

Project: West Windsor Hotel Site

○ **Source of Sample:** TP-3 (Stake 1005) **Depth:** 5

Date: ○

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Remarks:
○NMC = 11.6%

Figure

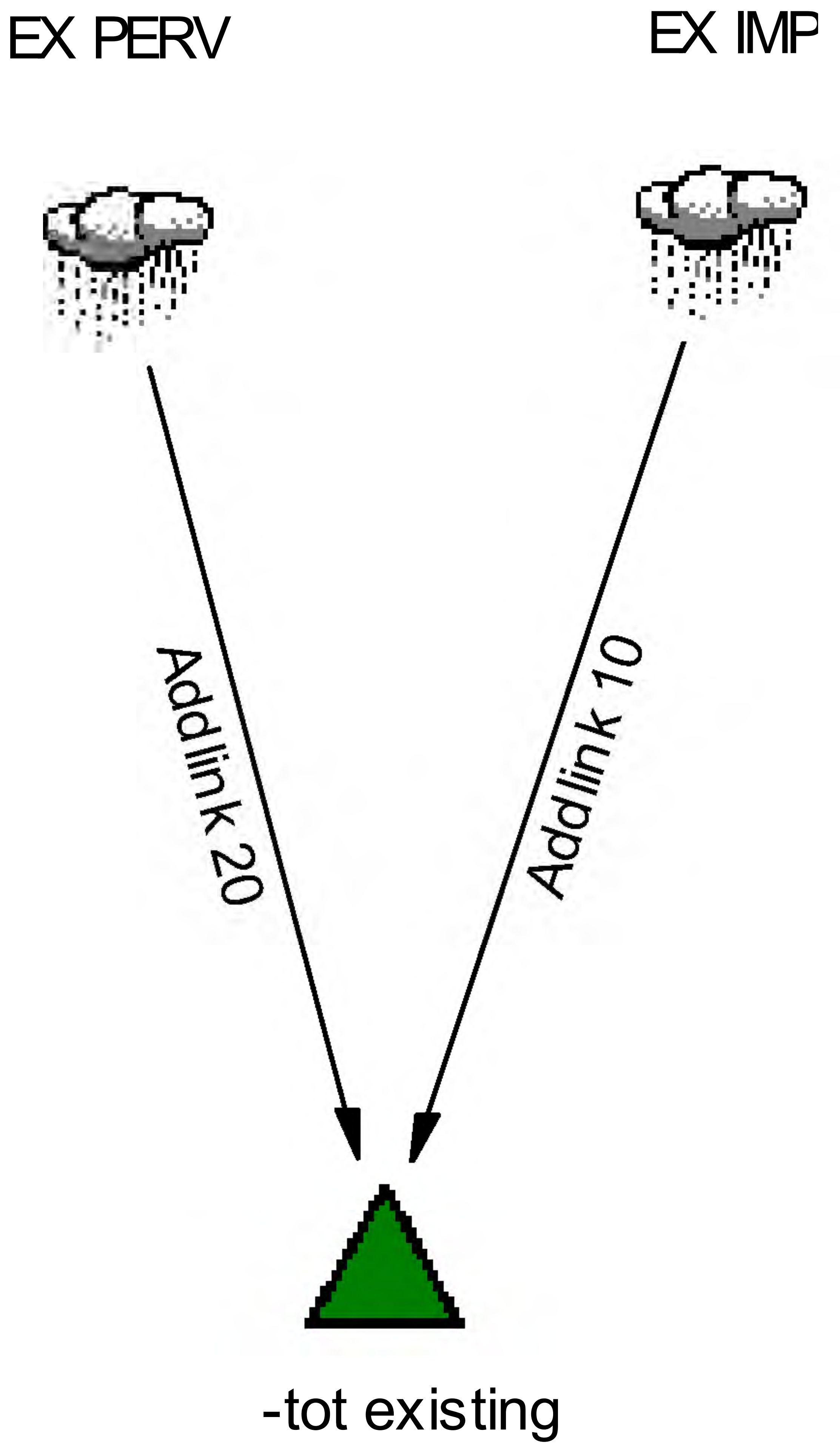
ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: SB **Checked By:** AMT

APPENDIX NO. 2
TR-55 CALCULATIONS
EXISTING CONDITIONS

==========================
JOB TITLE
==========================

Project Date: 10/14/2019
Project Engineer: JMW
Project Title: existing conditions - west windsor
Project Comments:


EX PERV
EX IMP
Addlink 20
Addlink 10
-tot existing

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MASTER DESIGN STORM SUMMARY

Network Storm Collection: mercer

Return Event	Total Depth in	Rainfall Type	RNF ID
2	3.3100	Synthetic Curve	TypeIII 24hr
10	5.0100	Synthetic Curve	TypeIII 24hr
100	8.3300	Synthetic Curve	TypeIII 24hr
1	1.2500	Time-Depth Curve	WQ125IN

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*-TOT EXISTING	JCT	2	2.094		12.9000	6.15		
*-TOT EXISTING	JCT	10	5.475		12.8000	23.17		
*-TOT EXISTING	JCT	100	14.391		12.7000	71.21		
*-TOT EXISTING	JCT	1	.184		1.1000	6.11		
EX IMP	AREA	2	.538		12.1000	5.75		
EX IMP	AREA	10	.835		12.1000	8.75		
EX IMP	AREA	100	1.416		12.1000	14.60		
EX IMP	AREA	1	.184		1.1000	6.11		
EX PERV	AREA	2	1.555		12.9000	5.52		
EX PERV	AREA	10	4.639		12.8000	22.12		
EX PERV	AREA	100	12.975		12.7000	69.30		
EX PERV	AREA	1	.000		.1000	.00		

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ===

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .1700
Hydraulic Length   150.00 ft
2yr, 24hr P        3.3100 in
Slope            .001000 ft/ft

Avg.Velocity          .05 ft/sec

                                         Segment #1 Time:     .8136 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length  1265.00 ft
Slope            .013000 ft/ft
Unpaved

Avg.Velocity         1.84 ft/sec

                                         Segment #2 Time:     .1910 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:    1.0046 hrs
                                               =========================
```

```
-------------------------------------------------------------------------
Tc Equations used...
-------------------------------------------------------------------------


==== SCS TR-55 Sheet Flow ===============================================

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

     Where:  Tc = Time of concentration, hrs
             n  = Mannings n
             Lf = Flow length, ft
             P  = 2yr, 24hr Rain depth, inches
             Sf = Slope, %


==== SCS TR-55 Shallow Concentrated Flow ================================

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

     Tc = (Lf / V) / (3600sec/hr)

     Where:  V  = Velocity, ft/sec
             Sf = Slope, ft/ft
             Tc = Time of concentration, hrs
             Lf = Flow length, ft
```

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious	98	2.100			98.00
COMPOSITE AREA & WEIGHTED CN --->		2.100			98.00 (98)

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Row crops - Cont & terraced(C&T), p	62	40.400			62.00
Woods - grass combination - good	32	4.500			32.00

COMPOSITE AREA & WEIGHTED CN ---> 44.900 58.99 (59)

:::

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX IMP 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.0933 hrs
Computed Peak Flow             =     6.15 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.1000 hrs
Peak Flow, Interpolated Output =     6.11 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX IMP
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      1.0346 in
                        .181 ac-ft

HYG Volume...           .184 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: EX IMP)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    23.79 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX IMP 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1067 hrs
Computed Peak Flow             =     5.75 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     5.75 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX IMP
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      3.0771 in
                        .538 ac-ft

HYG Volume...           .538 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: EX IMP)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    23.79 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX IMP 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1067 hrs
Computed Peak Flow             =     8.75 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     8.75 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX IMP
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      4.7732 in
                        .835 ac-ft

HYG Volume...           .835 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: EX IMP)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    23.79 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX IMP 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.0933 hrs
Computed Peak Flow             =    14.61 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    14.60 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX IMP
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      8.0900 in
                       1.416 ac-ft

HYG Volume...          1.416 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: EX IMP)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    23.79 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX PERV 1
Tc            = 1.0046 hrs
Drainage Area = 44.900 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .13395 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX PERV
              CN   =   59
              Area =      44.900 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =  1.00462 hrs (ID: EX PERV)
Computational Incr, Tm =   .13395 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    50.64 cfs
Unit peak time      Tp =   .66975 hrs
Unit receding limb, Tr =  2.67899 hrs
Total unit time,    Tb =  3.34874 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX PERV 2
Tc            = 1.0046 hrs
Drainage Area = 44.900 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .13395 hrs
Computed Peak Time             =  12.8592 hrs
Computed Peak Flow             =     5.54 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.9000 hrs
Peak Flow, Interpolated Output =     5.52 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX PERV
              CN   =   59
              Area =      44.900 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                       .4157 in
                       1.555 ac-ft

HYG Volume...          1.555 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =  1.00462 hrs (ID: EX PERV)
Computational Incr, Tm =   .13395 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    50.64 cfs
Unit peak time      Tp =   .66975 hrs
Unit receding limb, Tr =  2.67899 hrs
Total unit time,    Tb =  3.34874 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX PERV 10
Tc            = 1.0046 hrs
Drainage Area = 44.900 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .13395 hrs
Computed Peak Time             =  12.7252 hrs
Computed Peak Flow             =    22.19 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.8000 hrs
Peak Flow, Interpolated Output =    22.12 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:EX PERV
              CN   =   59
              Area =      44.900 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                      1.2400 in
                       4.640 ac-ft

HYG Volume...          4.639 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =  1.00462 hrs (ID: EX PERV)
Computational Incr, Tm =   .13395 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    50.64 cfs
Unit peak time      Tp =   .66975 hrs
Unit receding limb, Tr =  2.67899 hrs
Total unit time,    Tb =  3.34874 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - EX PERV 100
Tc            = 1.0046 hrs
Drainage Area = 44.900 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .13395 hrs
Computed Peak Time             =  12.7252 hrs
Computed Peak Flow             =    69.83 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.7000 hrs
Peak Flow, Interpolated Output =    69.30 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:EX PERV
              CN   =   59
              Area =      44.900 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                      3.4678 in
                      12.976 ac-ft

HYG Volume...         12.975 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =  1.00462 hrs (ID: EX PERV)
Computational Incr, Tm =   .13395 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    50.64 cfs
Unit peak time      Tp =   .66975 hrs
Unit receding limb, Tr =  2.67899 hrs
Total unit time,    Tb =  3.34874 hrs
```

SUMMARY FOR HYDROGRAPH ADDITION
at Node: -TOT EXISTING

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 10	EX IMP		EX IMP	1
ADDLINK 20	EX PERV		EX PERV	1

INFLOWS TO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	EX IMP	1	.184	1.1000	6.11
	EX PERV	1	.000	.1000	.00

TOTAL FLOW INTO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	-TOT EXISTING	1	.184	1.1000	6.11

TOTAL NODE INFLOW...
HYG file =
HYG ID = -TOT EXISTING
HYG Tag = 1

Peak Discharge =	6.11	cfs
Time to Peak =	1.1000	hrs
HYG Volume =	.184	ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.3000	.00	.05	.17	.35	.47
.8000	.68	1.47	4.47	6.11	3.00
1.3000	1.45	.88	.82	.67	.62
1.8000	.51	.24	.21	.05	.00
2.3000	.00				

SUMMARY FOR HYDROGRAPH ADDITION
at Node: -TOT EXISTING

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 10	EX IMP		EX IMP	2
ADDLINK 20	EX PERV		EX PERV	2

INFLOWS TO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	EX IMP	2	.538	12.1000	5.75
	EX PERV	2	1.555	12.9000	5.52

TOTAL FLOW INTO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	-TOT EXISTING	2	2.094	12.9000	6.15

TOTAL NODE INFLOW...
HYG file =
HYG ID = -TOT EXISTING
HYG Tag = 2

Peak Discharge = 6.15 cfs
Time to Peak = 12.9000 hrs
HYG Volume = 2.094 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
1.3000	.00	.00	.00	.01	.01
1.8000	.01	.01	.01	.02	.02
2.3000	.02	.02	.02	.02	.03
2.8000	.03	.03	.03	.03	.03
3.3000	.04	.04	.04	.04	.04
3.8000	.05	.05	.05	.05	.05
4.3000	.05	.06	.06	.06	.06
4.8000	.06	.06	.07	.07	.07
5.3000	.07	.07	.07	.08	.08
5.8000	.08	.08	.08	.08	.09
6.3000	.09	.09	.10	.10	.10
6.8000	.11	.11	.12	.12	.12
7.3000	.13	.13	.13	.14	.14
7.8000	.15	.15	.15	.16	.17
8.3000	.17	.18	.19	.20	.21
8.8000	.21	.22	.23	.24	.25
9.3000	.26	.26	.27	.28	.29
9.8000	.30	.31	.31	.33	.34
10.3000	.36	.37	.39	.41	.43
10.8000	.44	.46	.48	.51	.57
11.3000	.63	.69	.76	1.02	1.55
11.8000	2.16	2.78	5.14	6.01	4.32
12.3000	3.89	4.16	4.54	5.09	5.66
12.8000	6.02	6.15	6.04	5.72	5.36
13.3000	5.00	4.65	4.35	4.09	3.86
13.8000	3.65	3.47	3.32	3.18	3.05
14.3000	2.95	2.85	2.75	2.67	2.59
14.8000	2.52	2.46	2.40	2.34	2.28
15.3000	2.22	2.17	2.12	2.06	2.01
15.8000	1.96	1.91	1.85	1.80	1.75
16.3000	1.70	1.66	1.61	1.57	1.53

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.8000	1.49	1.46	1.42	1.39	1.36
17.3000	1.34	1.31	1.28	1.25	1.23
17.8000	1.20	1.17	1.15	1.12	1.10
18.3000	1.07	1.05	1.03	1.01	.99
18.8000	.98	.96	.95	.94	.93
19.3000	.92	.91	.90	.89	.88
19.8000	.88	.87	.86	.85	.84
20.3000	.84	.83	.82	.81	.81
20.8000	.80	.79	.79	.78	.78
21.3000	.77	.76	.76	.75	.74
21.8000	.74	.73	.73	.72	.71
22.3000	.71	.70	.70	.69	.68
22.8000	.68	.67	.66	.66	.65
23.3000	.64	.64	.63	.63	.62
23.8000	.61	.61	.60	.54	.51
24.3000	.48	.44	.38	.32	.27
24.8000	.22	.17	.13	.10	.08
25.3000	.06	.05	.04	.03	.02
25.8000	.02	.01	.01	.01	.01
26.3000	.00	.00	.00	.00	.00
26.8000	.00				

SUMMARY FOR HYDROGRAPH ADDITION
at Node: -TOT EXISTING

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 10	EX IMP		EX IMP	10
ADDLINK 20	EX PERV		EX PERV	10

INFLOWS TO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	EX IMP	10	.835	12.1000	8.75
	EX PERV	10	4.639	12.8000	22.12

TOTAL FLOW INTO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	-TOT EXISTING	10	5.475	12.8000	23.17

TOTAL NODE INFLOW...
HYG file =
HYG ID = -TOT EXISTING
HYG Tag = 10

Peak Discharge = 23.17 cfs
Time to Peak = 12.8000 hrs
HYG Volume = 5.475 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.8000	.00	.00	.01	.01	.01
1.3000	.02	.02	.03	.03	.03
1.8000	.04	.04	.04	.04	.05
2.3000	.05	.05	.06	.06	.06
2.8000	.06	.07	.07	.07	.07
3.3000	.08	.08	.08	.09	.09
3.8000	.09	.09	.10	.10	.10
4.3000	.10	.11	.11	.11	.11
4.8000	.12	.12	.12	.12	.12
5.3000	.13	.13	.13	.13	.14
5.8000	.14	.14	.14	.15	.15
6.3000	.16	.16	.17	.17	.18
6.8000	.18	.19	.19	.20	.20
7.3000	.21	.22	.22	.23	.23
7.8000	.24	.24	.25	.26	.27
8.3000	.28	.29	.31	.32	.33
8.8000	.34	.36	.37	.38	.39
9.3000	.40	.42	.43	.44	.46
9.8000	.47	.48	.49	.51	.53
10.3000	.56	.58	.61	.64	.66
10.8000	.69	.71	.74	.79	.88
11.3000	.97	1.07	1.18	1.62	2.53
11.8000	3.64	5.04	9.62	12.45	11.90
12.3000	13.89	16.81	19.45	21.72	22.97
12.8000	23.17	22.48	21.04	19.15	17.32
13.3000	15.62	14.09	12.83	11.76	10.82
13.8000	10.02	9.37	8.80	8.30	7.87
14.3000	7.50	7.16	6.86	6.58	6.35
14.8000	6.14	5.94	5.75	5.58	5.42
15.3000	5.26	5.11	4.97	4.84	4.70
15.8000	4.57	4.44	4.31	4.18	4.05

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.3000	3.93	3.81	3.70	3.59	3.50
16.8000	3.40	3.32	3.24	3.17	3.10
17.3000	3.03	2.96	2.90	2.83	2.77
17.8000	2.70	2.64	2.58	2.52	2.46
18.3000	2.40	2.35	2.30	2.25	2.21
18.8000	2.18	2.14	2.11	2.09	2.06
19.3000	2.04	2.02	1.99	1.97	1.95
19.8000	1.93	1.91	1.90	1.88	1.86
20.3000	1.84	1.82	1.81	1.79	1.77
20.8000	1.76	1.74	1.73	1.71	1.70
21.3000	1.68	1.67	1.65	1.64	1.63
21.8000	1.61	1.60	1.58	1.57	1.56
22.3000	1.54	1.53	1.51	1.50	1.48
22.8000	1.47	1.45	1.44	1.43	1.41
23.3000	1.40	1.38	1.37	1.35	1.34
23.8000	1.32	1.31	1.29	1.20	1.14
24.3000	1.07	.97	.85	.72	.60
24.8000	.48	.38	.30	.23	.18
25.3000	.14	.11	.09	.07	.05
25.8000	.04	.03	.02	.02	.01
26.3000	.01	.01	.01	.00	.00
26.8000	.00	.00	.00		

SUMMARY FOR HYDROGRAPH ADDITION
at Node: -TOT EXISTING

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 10	EX IMP		EX IMP	100
ADDLINK 20	EX PERV		EX PERV	100

INFLOWS TO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	EX IMP	100	1.416	12.1000	14.60
	EX PERV	100	12.975	12.7000	69.30

TOTAL FLOW INTO: -TOT EXISTING

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	-TOT EXISTING	100	14.391	12.7000	71.21

TOTAL NODE INFLOW...
HYG file =
HYG ID   = -TOT EXISTING
HYG Tag =   100

Peak Discharge =	71.21 cfs
Time to Peak =	12.7000 hrs
HYG Volume =	14.391 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

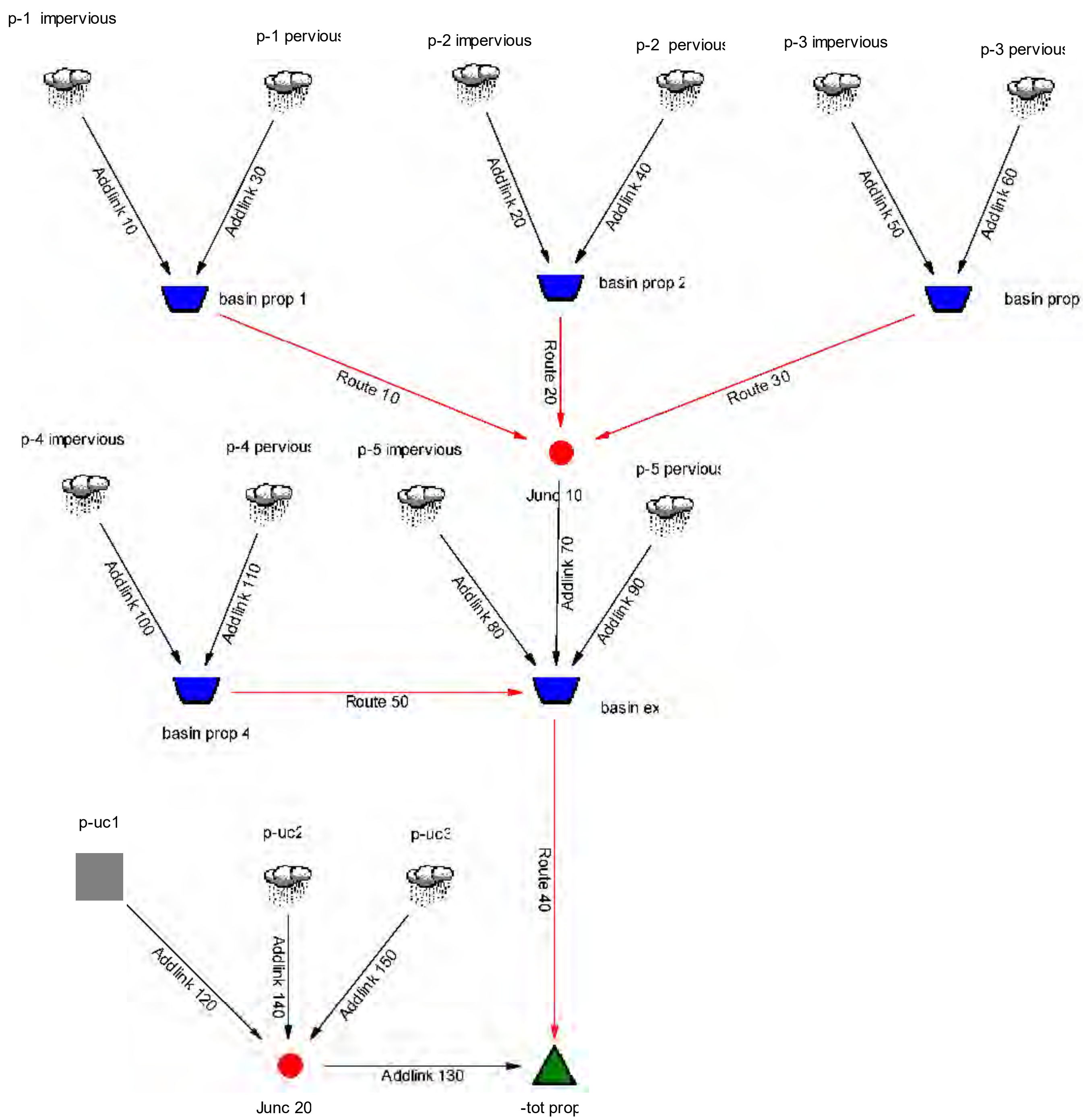
Time hrs					
.5000	.00	.01	.02	.03	.04
1.0000	.05	.06	.06	.07	.08
1.5000	.08	.09	.09	.10	.10
2.0000	.11	.11	.11	.12	.12
2.5000	.13	.13	.14	.14	.15
3.0000	.15	.16	.16	.16	.17
3.5000	.17	.18	.18	.18	.19
4.0000	.19	.20	.20	.20	.21
4.5000	.21	.21	.22	.22	.22
5.0000	.23	.23	.23	.24	.24
5.5000	.24	.25	.25	.25	.26
6.0000	.26	.27	.27	.28	.29
6.5000	.30	.31	.32	.33	.34
7.0000	.34	.35	.36	.37	.38
7.5000	.39	.40	.41	.42	.43
8.0000	.44	.45	.47	.49	.51
8.5000	.53	.55	.57	.59	.61
9.0000	.63	.65	.67	.69	.71
9.5000	.73	.76	.78	.81	.85
10.0000	.91	.99	1.11	1.26	1.43
10.5000	1.63	1.85	2.10	2.38	2.69
11.0000	3.01	3.42	3.93	4.49	5.12
11.5000	5.84	7.27	9.68	12.68	16.76
12.0000	27.08	35.32	38.72	47.05	56.28
12.5000	63.91	69.47	71.21	69.84	66.10
13.0000	60.45	53.99	47.99	42.55	37.77
13.5000	33.90	30.62	27.81	25.42	23.50
14.0000	21.85	20.41	19.17	18.12	17.19
14.5000	16.35	15.61	14.97	14.39	13.87
15.0000	13.38	12.94	12.51	12.11	11.74
15.5000	11.39	11.06	10.74	10.42	10.11

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.0000	9.79	9.49	9.19	8.90	8.62
16.5000	8.35	8.10	7.87	7.65	7.46
17.0000	7.27	7.10	6.93	6.77	6.62
17.5000	6.47	6.32	6.17	6.02	5.88
18.0000	5.74	5.60	5.46	5.33	5.21
18.5000	5.09	4.99	4.89	4.81	4.73
19.0000	4.66	4.60	4.54	4.49	4.44
19.5000	4.39	4.34	4.29	4.25	4.20
20.0000	4.16	4.12	4.08	4.03	3.99
20.5000	3.95	3.92	3.88	3.84	3.81
21.0000	3.77	3.74	3.70	3.67	3.64
21.5000	3.61	3.57	3.54	3.51	3.48
22.0000	3.45	3.41	3.38	3.35	3.32
22.5000	3.29	3.25	3.22	3.19	3.16
23.0000	3.13	3.09	3.06	3.03	3.00
23.5000	2.96	2.93	2.90	2.87	2.83
24.0000	2.80	2.63	2.50	2.34	2.14
24.5000	1.88	1.59	1.32	1.05	.83
25.0000	.65	.51	.39	.31	.24
25.5000	.19	.15	.11	.09	.07
26.0000	.05	.04	.03	.02	.02
26.5000	.01	.01	.01	.00	.00
27.0000	.00	.00			

Index of Starting Page Numbers for ID Names

APPENDIX NO. 3
TR-55 CALCULATIONS
PROPOSED CONDITIONS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Addlink 60
basin prop 1
basin prop 2
basin prop
Route 10
Route 20
Route 30
p-4 impervious
p-4 pervious
p-5 impervious
p-5 pervious
Junc 10
Addlink 100
Addlink 110
Addlink 80
Addlink 70
Addlink 90
Route 50
basin ex
basin prop 4
p-uc1
p-uc2
p-uc3
Route 40
Addlink 120
Addlink 140
Addlink 150
Addlink 130
Junc 20
-tot prop

==========================
JOB TITLE
==========================

Project Date: 3/16/2020
Project Engineer: JMW
Project Title: proposed conditions
Project Comments:

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Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

MASTER DESIGN STORM SUMMARY

Network Storm Collection: mercer

Return Event	Total Depth in	Rainfall Type	RNF ID
2	3.3100	Synthetic Curve	TypeIII 24hr
10	5.0100	Synthetic Curve	TypeIII 24hr
100	8.3300	Synthetic Curve	TypeIII 24hr
1	1.2500	Time-Depth Curve	WQ125IN

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*-TOT PROP		JCT	2	4.678		12.1000	1.65		
*-TOT PROP		JCT	10	9.057		12.1000	6.63		
*-TOT PROP		JCT	100	18.779		12.1000	21.06		
*-TOT PROP		JCT	1	.310		1.7000	.06		
BASIN EX	IN	POND	2	5.108		12.2000	37.32		
BASIN EX	IN	POND	10	9.089		12.2000	61.24		
BASIN EX	IN	POND	100	17.698		12.2000	129.73		
BASIN EX	IN	POND	1	.938		1.2000	17.76		
BASIN EX	OUT	POND	2	4.477		23.2000	.54	67.18	4.487
BASIN EX	OUT	POND	10	8.458		24.2000	.93	68.86	8.182
BASIN EX	OUT	POND	100	17.067		14.2000	15.80	69.95	10.697
BASIN EX	OUT	POND	1	.307		2.4000	.05	65.47	.932

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
BASIN PROP 1 IN	POND	2	2.385		12.1000	22.49		
BASIN PROP 1 IN	POND	10	3.765		12.1000	34.29		
BASIN PROP 1 IN	POND	100	6.691		12.1000	60.93		
BASIN PROP 1 IN	POND	1	.808		1.1000	21.99		
BASIN PROP 1 OUT	POND	2	1.253		13.1000	2.42	72.24	1.597
BASIN PROP 1 OUT	POND	10	2.632		12.6000	8.23	72.87	2.215
BASIN PROP 1 OUT	POND	100	5.558		12.4000	34.26	73.59	2.971
BASIN PROP 1 OUT	POND	1	.000		.4000	.00	71.38	.808
BASIN PROP 2 IN	POND	2	1.154		12.1000	10.88		
BASIN PROP 2 IN	POND	10	1.835		12.1000	16.59		
BASIN PROP 2 IN	POND	100	3.325		12.1000	30.25		
BASIN PROP 2 IN	POND	1	.391		1.1000	10.64		
BASIN PROP 2 OUT	POND	2	.891		12.2000	10.25	69.59	.368
BASIN PROP 2 OUT	POND	10	1.572		12.2000	14.82	69.76	.400
BASIN PROP 2 OUT	POND	100	3.062		12.2000	26.29	70.22	.494
BASIN PROP 2 OUT	POND	1	.128		1.6000	2.20	69.22	.300
BASIN PROP 3 IN	POND	2	.538		12.1000	5.08		
BASIN PROP 3 IN	POND	10	.861		12.1000	7.74		
BASIN PROP 3 IN	POND	100	1.578		12.1000	14.35		
BASIN PROP 3 IN	POND	1	.182		1.1000	4.97		
BASIN PROP 3 OUT	POND	2	.397		12.2000	4.40	69.50	.190
BASIN PROP 3 OUT	POND	10	.719		12.2000	6.87	69.67	.208
BASIN PROP 3 OUT	POND	100	1.436		12.2000	12.88	70.03	.246
BASIN PROP 3 OUT	POND	1	.041		1.7000	.71	69.14	.155
BASIN PROP 4 IN	POND	2	1.513		12.1000	14.27		
BASIN PROP 4 IN	POND	10	2.384		12.1000	21.75		
BASIN PROP 4 IN	POND	100	4.215		12.1000	38.40		
BASIN PROP 4 IN	POND	1	.513		1.1000	13.95		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
BASIN PROP 4 OUT	POND	2	1.362		12.2000	12.90	68.28	.254
BASIN PROP 4 OUT	POND	10	2.233		12.2000	20.20	68.59	.290
BASIN PROP 4 OUT	POND	100	4.064		12.1000	36.96	68.93	.330
BASIN PROP 4 OUT	POND	1	.362		1.2000	9.39	68.08	.233
JUNC 10	JCT	2	2.540		12.2000	14.89		
JUNC 10	JCT	10	4.923		12.2000	26.51		
JUNC 10	JCT	100	10.056		12.3000	69.06		
JUNC 10	JCT	1	.168		1.6000	2.89		
JUNC 20	JCT	2	.201		12.1000	1.53		
JUNC 20	JCT	10	.600		12.1000	6.30		
JUNC 20	JCT	100	1.713		12.1000	20.51		
JUNC 20	JCT	1	.003		1.3000	.05		
P-1 IMPERVIOUS	AREA	2	2.385		12.1000	22.49		
P-1 IMPERVIOUS	AREA	10	3.699		12.1000	34.29		
P-1 IMPERVIOUS	AREA	100	6.270		12.1000	57.24		
P-1 IMPERVIOUS	AREA	1	.808		1.1000	21.99		
P-1 PERVIOUS	AREA	2	.001		20.3000	.00		
P-1 PERVIOUS	AREA	10	.066		12.5000	.14		
P-1 PERVIOUS	AREA	100	.421		12.1000	3.69		
P-1 PERVIOUS	AREA	1	.000		.1000	.00		
P-2 PERVIOUS	AREA	2	.000		20.9000	.00		
P-2 PERVIOUS	AREA	10	.045		12.5000	.10		
P-2 PERVIOUS	AREA	100	.291		12.1000	2.56		
P-2 PERVIOUS	AREA	1	.000		.1000	.00		
P-2 IMPERVIOUS	AREA	2	1.154		12.1000	10.88		
P-2 IMPERVIOUS	AREA	10	1.790		12.1000	16.59		
P-2 IMPERVIOUS	AREA	100	3.034		12.1000	27.70		
P-2 IMPERVIOUS	AREA	1	.391		1.1000	10.64		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
P-3 IMPERVIOUS	AREA	2	.538		12.1000	5.08		
P-3 IMPERVIOUS	AREA	10	.835		12.1000	7.74		
P-3 IMPERVIOUS	AREA	100	1.416		12.1000	12.92		
P-3 IMPERVIOUS	AREA	1	.182		1.1000	4.97		
P-3 PERVIOUS	AREA	2	.000		.1000	.00		
P-3 PERVIOUS	AREA	10	.025		12.5000	.05		
P-3 PERVIOUS	AREA	100	.162		12.1000	1.42		
P-3 PERVIOUS	AREA	1	.000		.1000	.00		
P-4 IMPERVIOUS	AREA	2	1.513		12.1000	14.27		
P-4 IMPERVIOUS	AREA	10	2.347		12.1000	21.75		
P-4 IMPERVIOUS	AREA	100	3.978		12.1000	36.31		
P-4 IMPERVIOUS	AREA	1	.513		1.1000	13.95		
P-4 PERVIOUS	AREA	2	.000		21.5000	.00		
P-4 PERVIOUS	AREA	10	.037		12.5000	.08		
P-4 PERVIOUS	AREA	100	.237		12.1000	2.08		
P-4 PERVIOUS	AREA	1	.000		.1000	.00		
P-5 IMPERVIOUS	AREA	2	1.205		12.1000	11.37		
P-5 IMPERVIOUS	AREA	10	1.869		12.1000	17.33		
P-5 IMPERVIOUS	AREA	100	3.169		12.1000	28.93		
P-5 IMPERVIOUS	AREA	1	.408		1.1000	11.11		
P-5 PERVIOUS	AREA	2	.001		20.3000	.00		
P-5 PERVIOUS	AREA	10	.064		12.5000	.14		
P-5 PERVIOUS	AREA	100	.410		12.1000	3.60		
P-5 PERVIOUS	AREA	1	.000		.1000	.00		
P-UC1	AREA	2	.040		12.4000	.11		
P-UC1	AREA	10	.185		12.1000	1.46		
P-UC1	AREA	100	.653		12.1000	7.59		
P-UC1	AREA	1	.000		.1000	.00		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
P-UC2	AREA	2	.098		12.1000	1.10		
P-UC2	AREA	10	.229		12.1000	2.77		
P-UC2	AREA	100	.540		12.1000	6.60		
P-UC2	AREA	1	.003		1.3000	.05		
P-UC3	AREA	2	.062		12.1000	.44		
P-UC3	AREA	10	.186		12.1000	2.06		
P-UC3	AREA	100	.520		12.1000	6.32		
P-UC3	AREA	1	.000		.1000	.00		

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                                 =========================
                                                  Total Tc:     .1000 hrs

                                                  Calculated Tc < Min.Tc:
                                                  Use Minimum Tc...
                                                  Use Tc =      .1000 hrs
                                                 =========================
```

Tc Equations used...

==== User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

```
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


-----------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
-----------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ===

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

```
------------------------------------------------------------------------
Tc Equations used...
------------------------------------------------------------------------


==== User Defined ======================================================

     Tc = Value entered by user

     Where:  Tc = Time of concentration
```

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                                 =========================
                                                  Total Tc:     .1000 hrs

                                                  Calculated Tc < Min.Tc:
                                                  Use Minimum Tc...
                                                  Use Tc =      .1000 hrs
                                                 =========================
```

Tc Equations used...

==== User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
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------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                          Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                                =========================
                                                 Total Tc:     .1000 hrs

                                                 Calculated Tc < Min.Tc:
                                                 Use Minimum Tc...
                                                 Use Tc =      .1000 hrs
                                                =========================
```

```
-----------------------------------------------------------------------
Tc Equations used...
-----------------------------------------------------------------------

==== User Defined ======================================================

     Tc = Value entered by user

     Where:  Tc = Time of concentration
```

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                          Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                                =========================
                                                 Total Tc:     .1000 hrs

                                                 Calculated Tc < Min.Tc:
                                                 Use Minimum Tc...
                                                 Use Tc =      .1000 hrs
                                                =========================
```

```
-------------------------------------------------------------------------
Tc Equations used...
-------------------------------------------------------------------------


==== User Defined =======================================================

     Tc = Value entered by user

     Where:  Tc = Time of concentration
```

```
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


------------------------------------------------------------------------


Segment #1:  Tc: User Defined

                                         Segment #1 Time:     .1000 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1000 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .1000 hrs
                                               =========================
```

```
------------------------------------------------------------------------
Tc Equations used...
------------------------------------------------------------------------


==== User Defined ======================================================

     Tc = Value entered by user

     Where:  Tc = Time of concentration
```

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
impervious	98	9.300			98.00
COMPOSITE AREA & WEIGHTED CN --->		9.300			98.00 (98)

::

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
open space	39	3.900			39.00
COMPOSITE AREA & WEIGHTED CN --->		3.900			39.00 (39)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
open space	39	2.700			39.00
COMPOSITE AREA & WEIGHTED CN --->		2.700			39.00 (39)

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
impervious	98	4.500			98.00
COMPOSITE AREA & WEIGHTED CN --->		4.500			98.00 (98)

::

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
impervious	98	2.100			98.00
COMPOSITE AREA & WEIGHTED CN --->		2.100			98.00 (98)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
open space	39	1.500			39.00
COMPOSITE AREA & WEIGHTED CN --->		1.500			39.00 (39)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
impervious	98	5.900			98.00
COMPOSITE AREA & WEIGHTED CN --->		5.900			98.00 (98)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
open space	39	2.200			39.00
COMPOSITE AREA & WEIGHTED CN --->		2.200			39.00 (39)

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
impervious	98	3.300			98.00
ex pond	98	1.400			98.00
COMPOSITE AREA & WEIGHTED CN --->		4.700			98.00 (98)

::

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
open space	39	3.800			39.00
COMPOSITE AREA & WEIGHTED CN --->		3.800			39.00 (39)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
disconnected impervious	98	.600			98.00
open space	39	2.600			39.00
COMPOSITE AREA & WEIGHTED CN --->		3.200			50.06 (50)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
disconnected impervious	98	.700			98.00
open space	39	.700			39.00
COMPOSITE AREA & WEIGHTED CN --->		1.400			68.50 (69)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
disconnected impervious	98	.600			98.00
open space	39	1.200			39.00
COMPOSITE AREA & WEIGHTED CN --->		1.800			58.67 (59)

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1  IMPERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 9.300 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.1067 hrs
Computed Peak Flow             =    22.14 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.1000 hrs
Peak Flow, Interpolated Output =    21.99 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-1  IMPERVIOUS
              CN   =   98
              Area =       9.300 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      1.0346 in
                        .802 ac-ft

HYG Volume...           .808 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1  IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    61.47 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1  IMPERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 9.300 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    22.77 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    22.49 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:P-1  IMPERVIOUS
              CN   =   98
              Area =       9.300 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      3.0771 in
                       2.385 ac-ft

HYG Volume...          2.385 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1  IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    61.47 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1  IMPERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 9.300 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    34.70 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    34.29 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-1  IMPERVIOUS
              CN   =   98
              Area =       9.300 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      4.7732 in
                       3.699 ac-ft

HYG Volume...          3.699 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1  IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    61.47 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1  IMPERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 9.300 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    57.91 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    57.24 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-1  IMPERVIOUS
              CN   =   98
              Area =       9.300 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      8.0900 in
                       6.270 ac-ft

HYG Volume...          6.270 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1  IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    61.47 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1 PERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.900 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-1 PERVIOUS
              CN   =   39
              Area =       3.900 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    44.19 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1 PERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.900 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  24.0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  24.0001 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-1 PERVIOUS
              CN   =   39
              Area =       3.900 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0021 in
                        .001 ac-ft

HYG Volume...           .001 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    44.19 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1 PERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.900 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.4400 hrs
Computed Peak Flow             =      .15 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.5000 hrs
Peak Flow, Interpolated Output =      .14 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                DRAINAGE AREA
              -------------------
              ID:P-1 PERVIOUS
              CN   =   39
              Area =       3.900 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                    .2021 in
                     .066 ac-ft

HYG Volume...           .066 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    44.19 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-1 PERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.900 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =     4.05 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     3.69 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-1 PERVIOUS
              CN   =   39
              Area =       3.900 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                      1.2982 in
                        .422 ac-ft

HYG Volume...           .421 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-1 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    44.19 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2  PERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.700 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-2  PERVIOUS
              CN   =   39
              Area =       2.700 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2  PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    30.59 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2  PERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.700 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  24.0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  24.0001 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-2  PERVIOUS
              CN   =   39
              Area =       2.700 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0021 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2  PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    30.59 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2  PERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.700 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.4400 hrs
Computed Peak Flow             =      .10 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.5000 hrs
Peak Flow, Interpolated Output =      .10 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                DRAINAGE AREA
              -------------------
              ID:P-2  PERVIOUS
              CN   =   39
              Area =       2.700 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .2021 in
                        .045 ac-ft

HYG Volume...           .045 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2  PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    30.59 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2  PERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.700 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =     2.80 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     2.56 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

              DRAINAGE AREA
            -------------------
            ID:P-2  PERVIOUS
            CN   =   39
            Area =       2.700 acres
            S    =  15.6410 in
            0.2S =   3.1282 in

             Cumulative Runoff
            -------------------
                    1.2982 in
                      .292 ac-ft

HYG Volume...           .291 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2  PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    30.59 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2 IMPERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.500 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.1067 hrs
Computed Peak Flow             =    10.71 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.1000 hrs
Peak Flow, Interpolated Output =    10.64 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-2 IMPERVIOUS
              CN   =   98
              Area =       4.500 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      1.0346 in
                        .388 ac-ft

HYG Volume...           .391 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    29.74 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2 IMPERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.500 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    11.02 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    10.88 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-2 IMPERVIOUS
              CN   =   98
              Area =       4.500 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      3.0771 in
                       1.154 ac-ft

HYG Volume...          1.154 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =     .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    29.74 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2 IMPERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.500 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    16.79 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    16.59 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-2 IMPERVIOUS
              CN   =   98
              Area =       4.500 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      4.7732 in
                       1.790 ac-ft

HYG Volume...          1.790 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    29.74 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-2 IMPERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.500 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    28.02 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    27.70 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-2 IMPERVIOUS
              CN   =   98
              Area =       4.500 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      8.0900 in
                       3.034 ac-ft

HYG Volume...          3.034 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-2 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    29.74 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 IMPERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.1067 hrs
Computed Peak Flow             =     5.00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.1000 hrs
Peak Flow, Interpolated Output =     4.97 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:P-3 IMPERVIOUS
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      1.0346 in
                        .181 ac-ft

HYG Volume...           .182 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    13.88 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 IMPERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     5.14 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     5.08 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:P-3 IMPERVIOUS
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      3.0771 in
                        .538 ac-ft

HYG Volume...           .538 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    13.88 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 IMPERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     7.84 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     7.74 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-3 IMPERVIOUS
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      4.7732 in
                        .835 ac-ft

HYG Volume...           .835 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    13.88 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 IMPERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.100 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    13.08 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    12.92 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-3 IMPERVIOUS
              CN   =   98
              Area =       2.100 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      8.0900 in
                       1.416 ac-ft

HYG Volume...          1.416 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    13.88 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 PERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.500 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-3 PERVIOUS
              CN   =   39
              Area =       1.500 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =     .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    17.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 PERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.500 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  24.0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  24.0001 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-3 PERVIOUS
              CN   =   39
              Area =       1.500 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0021 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    17.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 PERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.500 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.4400 hrs
Computed Peak Flow             =      .06 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.5000 hrs
Peak Flow, Interpolated Output =      .05 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-3 PERVIOUS
              CN   =   39
              Area =       1.500 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .2021 in
                        .025 ac-ft

HYG Volume...           .025 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    17.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-3 PERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.500 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =     1.56 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     1.42 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-3 PERVIOUS
              CN   =   39
              Area =       1.500 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                      1.2982 in
                        .162 ac-ft

HYG Volume...           .162 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-3 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    17.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 IMPERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 5.900 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.1067 hrs
Computed Peak Flow             =    14.05 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.1000 hrs
Peak Flow, Interpolated Output =    13.95 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-4 IMPERVIOUS
              CN   =   98
              Area =       5.900 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      1.0346 in
                        .509 ac-ft

HYG Volume...           .513 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    39.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 IMPERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 5.900 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    14.44 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    14.27 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:P-4 IMPERVIOUS
              CN   =   98
              Area =       5.900 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      3.0771 in
                       1.513 ac-ft

HYG Volume...          1.513 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    39.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 IMPERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 5.900 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    22.01 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    21.75 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-4 IMPERVIOUS
              CN   =   98
              Area =       5.900 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      4.7732 in
                       2.347 ac-ft

HYG Volume...          2.347 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    39.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 IMPERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 5.900 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    36.74 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    36.31 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:P-4 IMPERVIOUS
              CN   =   98
              Area =       5.900 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      8.0900 in
                       3.978 ac-ft

HYG Volume...          3.978 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    39.00 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 PERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.200 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:P-4 PERVIOUS
              CN   =   39
              Area =       2.200 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    24.93 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 PERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.200 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  24.0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  24.0001 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-4 PERVIOUS
              CN   =   39
              Area =       2.200 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0021 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    24.93 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 PERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.200 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.4400 hrs
Computed Peak Flow             =      .08 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.5000 hrs
Peak Flow, Interpolated Output =      .08 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-4 PERVIOUS
              CN   =   39
              Area =       2.200 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .2021 in
                        .037 ac-ft

HYG Volume...           .037 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    24.93 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-4 PERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 2.200 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =     2.28 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     2.08 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-4 PERVIOUS
              CN   =   39
              Area =       2.200 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                      1.2982 in
                        .238 ac-ft

HYG Volume...           .237 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-4 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    24.93 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 IMPERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.700 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.1067 hrs
Computed Peak Flow             =    11.19 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.1000 hrs
Peak Flow, Interpolated Output =    11.11 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 IMPERVIOUS
              CN   =   98
              Area =       4.700 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      1.0346 in
                        .405 ac-ft

HYG Volume...           .408 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    31.07 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 IMPERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.700 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    11.51 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    11.37 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 IMPERVIOUS
              CN   =   98
              Area =       4.700 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      3.0771 in
                       1.205 ac-ft

HYG Volume...          1.205 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    31.07 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 IMPERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.700 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    17.54 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    17.33 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 IMPERVIOUS
              CN   =   98
              Area =       4.700 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      4.7732 in
                       1.869 ac-ft

HYG Volume...          1.869 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    31.07 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd File = Delmarva Unit Hydrograph
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 IMPERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 4.700 acres  Runoff CN= 98

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =    29.27 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =    28.93 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 IMPERVIOUS
              CN   =   98
              Area =       4.700 acres
              S    =    .2041 in
              0.2S =    .0408 in

               Cumulative Runoff
              -------------------
                      8.0900 in
                       3.169 ac-ft

HYG Volume...          3.169 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 IMPERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  284.057 (22.01% under rising limb)
K =  284.06/645.333,  K =    .4402 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   3.5437 (solved from K =   .4402)

Unit peak,          qp =    31.07 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .58667 hrs
Total unit time,    Tb =   .65333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 PERVIOUS 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.800 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 PERVIOUS
              CN   =   39
              Area =       3.800 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    43.06 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 PERVIOUS 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.800 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  24.0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  24.0001 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 PERVIOUS
              CN   =   39
              Area =       3.800 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .0021 in
                        .001 ac-ft

HYG Volume...           .001 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    43.06 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 PERVIOUS 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.800 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.4400 hrs
Computed Peak Flow             =      .15 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.5000 hrs
Peak Flow, Interpolated Output =      .14 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 PERVIOUS
              CN   =   39
              Area =       3.800 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                       .2021 in
                        .064 ac-ft

HYG Volume...           .064 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =     .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    43.06 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-5 PERVIOUS 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.800 acres  Runoff CN= 39

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =     3.95 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     3.60 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-5 PERVIOUS
              CN   =   39
              Area =       3.800 acres
              S    =  15.6410 in
              0.2S =   3.1282 in

               Cumulative Runoff
              -------------------
                      1.2982 in
                        .411 ac-ft

HYG Volume...           .410 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-5 PERVIOUS)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    43.06 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC1 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.200 acres  Runoff CN= 50

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC1
              CN   =   50
              Area =       3.200 acres
              S    =  10.0000 in
              0.2S =   2.0000 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC1)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    36.26 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC1 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.200 acres  Runoff CN= 50

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.4267 hrs
Computed Peak Flow             =      .12 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.4000 hrs
Peak Flow, Interpolated Output =      .11 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC1
              CN   =   50
              Area =       3.200 acres
              S    =  10.0000 in
              0.2S =   2.0000 in

               Cumulative Runoff
              -------------------
                       .1517 in
                        .040 ac-ft

HYG Volume...           .040 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC1)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    36.26 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC1 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.200 acres  Runoff CN= 50

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =     1.65 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     1.46 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                  DRAINAGE AREA
              -------------------
              ID:P-UC1
              CN   =   50
              Area =       3.200 acres
              S    =  10.0000 in
              0.2S =   2.0000 in

               Cumulative Runoff
              -------------------
                       .6964 in
                        .186 ac-ft

HYG Volume...           .185 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC1)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =     .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    36.26 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC1 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 3.200 acres  Runoff CN= 50

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     7.78 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     7.59 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC1
              CN   =   50
              Area =       3.200 acres
              S    =  10.0000 in
              0.2S =   2.0000 in

               Cumulative Runoff
              -------------------
                      2.4537 in
                        .654 ac-ft

HYG Volume...           .653 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC1)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    36.26 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC2 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.400 acres  Runoff CN= 69

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =   1.5333 hrs
Computed Peak Flow             =      .05 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =   1.5000 hrs
Peak Flow, Interpolated Output =      .05 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC2
              CN   =   69
              Area =       1.400 acres
              S    =   4.4928 in
              0.2S =    .8986 in

               Cumulative Runoff
              -------------------
                       .0255 in
                        .003 ac-ft

HYG Volume...           .003 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC2)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    15.86 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC2 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.400 acres  Runoff CN= 69

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     1.14 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     1.10 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC2
              CN   =   69
              Area =       1.400 acres
              S    =   4.4928 in
              0.2S =    .8986 in

               Cumulative Runoff
              -------------------
                       .8423 in
                        .098 ac-ft

HYG Volume...           .098 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC2)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    15.86 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC2 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.400 acres  Runoff CN= 69

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     2.81 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     2.77 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC2
              CN   =   69
              Area =       1.400 acres
              S    =   4.4928 in
              0.2S =    .8986 in

               Cumulative Runoff
              -------------------
                      1.9646 in
                        .229 ac-ft

HYG Volume...           .229 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC2)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    15.86 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC2 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.400 acres  Runoff CN= 69

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1067 hrs
Computed Peak Flow             =     6.63 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     6.60 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC2
              CN   =   69
              Area =       1.400 acres
              S    =   4.4928 in
              0.2S =    .8986 in

               Cumulative Runoff
              -------------------
                      4.6315 in
                        .540 ac-ft

HYG Volume...           .540 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC2)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    15.86 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 2.0000 hrs      Rain Depth = 1.2500 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - WQ125IN
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC3 1
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.800 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =    .0000 hrs
Computed Peak Flow             =      .00 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =    .0000 hrs
Peak Flow, Interpolated Output =      .00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC3
              CN   =   59
              Area =       1.800 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                       .0000 in
                        .000 ac-ft

HYG Volume...           .000 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC3)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    20.39 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.3100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC3 2
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.800 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1333 hrs
Computed Peak Flow             =      .51 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.2000 hrs
Peak Flow, Interpolated Output =      .44 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                DRAINAGE AREA
              -------------------
              ID:P-UC3
              CN   =   59
              Area =       1.800 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                       .4157 in
                        .062 ac-ft

HYG Volume...           .062 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC3)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    20.39 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0100 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC3 10
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.800 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     2.14 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     2.06 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
============================================

                DRAINAGE AREA
              -------------------
              ID:P-UC3
              CN   =   59
              Area =       1.800 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                      1.2400 in
                        .186 ac-ft

HYG Volume...           .186 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC3)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    20.39 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.3300 in
Rain Dir      = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\A
HYG File - ID =  - P-UC3 100
Tc (Min. Tc)  = .1000 hrs
Drainage Area = 1.800 acres  Runoff CN= 59

============================================
Computational Time Increment   =   .01333 hrs
Computed Peak Time             =  12.1200 hrs
Computed Peak Flow             =     6.40 cfs

Time Increment for HYG File    =    .1000 hrs
Peak Time, Interpolated Output =  12.1000 hrs
Peak Flow, Interpolated Output =     6.32 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:P-UC3
              CN   =   59
              Area =       1.800 acres
              S    =   6.9492 in
              0.2S =   1.3898 in

               Cumulative Runoff
              -------------------
                      3.4678 in
                        .520 ac-ft

HYG Volume...           .520 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .10000 hrs (ID: P-UC3)
Computational Incr, Tm =   .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    20.39 cfs
Unit peak time      Tp =   .06667 hrs
Unit receding limb, Tr =   .26667 hrs
Total unit time,    Tb =   .33333 hrs
```

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
65.00	-----	86301	0	.000	.000
70.50	-----	104100	285185	12.003	12.003

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
70.00	-----	12246	0	.000	.000
71.00	-----	33386	65852	.504	.504
72.00	-----	41688	112381	.860	1.364
73.00	-----	44262	128906	.986	2.350
73.50	-----	46893	136714	.523	2.873
74.00	-----	51696	147825	.566	3.439

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
67.00	-----	4370	0	.000	.000
72.00	-----	12850	24714	.946	.946

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
67.00	-----	2290	0	.000	.000
70.00	-----	4950	10607	.243	.243
72.00	-----	4950	14850	.227	.471

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
65.25	-----	2641	0	.000	.000
70.00	-----	6304	13025	.473	.473

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 70.00 ft
Increment = .10 ft
Max. Elev.= 74.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Inlet Box	R0	--->	C0	73.000	74.000
Weir-Rectangular	W0	--->	C0	71.750	74.000
Culvert-Circular	C0	--->	TW	68.500	74.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID      = R0
Structure Type    = Inlet Box
------------------------------------
# of Openings     =         1
Invert Elev.      =     73.00 ft
Orifice Area      =   12.0000 sq.ft
Orifice Coeff.    =      .600
Weir Length       =     12.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No


Structure ID      = W0
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =     71.75 ft
Weir Length       =      2.25 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)
```

```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C0
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =        1
              Barrel Diameter   =    3.0000 ft
              Upstream Invert   =     68.50 ft
              Dnstream Invert   =     68.20 ft
              Horiz. Length     =     39.00 ft
              Barrel Length     =     39.00 ft
              Barrel Slope      =    .00769 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .007228  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =        1
              Inlet Control K   =     .0018
              Inlet Control M   =    2.5000
              Inlet Control c   =    .03000
              Inlet Control Y   =     .7400
              T1 ratio (HW/D)   =     1.078
              T2 ratio (HW/D)   =     1.216
              Slope Factor      =     -.500

 Use unsubmerged inlet control Form 1 equ. below T1 elev.
 Use   submerged inlet control Form 1 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =     71.73 ft  --->  Flow =     42.85 cfs
 At T2 Elev =     72.15 ft  --->  Flow =     48.97 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    40
              Min. TW tolerance =    .01 ft
              Max. TW tolerance =    .01 ft
              Min. HW tolerance =    .01 ft
              Max. HW tolerance =    .01 ft
              Min.  Q tolerance =    .00 cfs
              Max.  Q tolerance =    .00 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		-------- Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
70.00	.00	Free Outfall		(no Q: R0,W0,C0)
70.10	.00	Free Outfall		(no Q: R0,W0,C0)
70.20	.00	Free Outfall		(no Q: R0,W0,C0)
70.30	.00	Free Outfall		(no Q: R0,W0,C0)
70.40	.00	Free Outfall		(no Q: R0,W0,C0)
70.50	.00	Free Outfall		(no Q: R0,W0,C0)
70.60	.00	Free Outfall		(no Q: R0,W0,C0)
70.70	.00	Free Outfall		(no Q: R0,W0,C0)
70.80	.00	Free Outfall		(no Q: R0,W0,C0)
70.90	.00	Free Outfall		(no Q: R0,W0,C0)
71.00	.00	Free Outfall		(no Q: R0,W0,C0)
71.10	.00	Free Outfall		(no Q: R0,W0,C0)
71.20	.00	Free Outfall		(no Q: R0,W0,C0)
71.30	.00	Free Outfall		(no Q: R0,W0,C0)
71.40	.00	Free Outfall		(no Q: R0,W0,C0)
71.50	.00	Free Outfall		(no Q: R0,W0,C0)
71.60	.00	Free Outfall		(no Q: R0,W0,C0)
71.70	.00	Free Outfall		(no Q: R0,W0,C0)
71.75	.00	Free Outfall		(no Q: R0,W0,C0)
71.80	.08	Free Outfall		W0,C0 (no Q: R0)
71.90	.40	Free Outfall		W0,C0 (no Q: R0)
72.00	.87	Free Outfall		W0,C0 (no Q: R0)
72.10	1.44	Free Outfall		W0,C0 (no Q: R0)
72.20	2.11	Free Outfall		W0,C0 (no Q: R0)
72.30	2.85	Free Outfall		W0,C0 (no Q: R0)
72.40	3.66	Free Outfall		W0,C0 (no Q: R0)
72.50	4.53	Free Outfall		W0,C0 (no Q: R0)
72.60	5.47	Free Outfall		W0,C0 (no Q: R0)
72.70	6.46	Free Outfall		W0,C0 (no Q: R0)
72.80	7.51	Free Outfall		W0,C0 (no Q: R0)
72.90	8.60	Free Outfall		W0,C0 (no Q: R0)
73.00	9.75	Free Outfall		W0,C0 (no Q: R0)
73.10	12.11	Free Outfall		R0,W0,C0
73.20	15.50	Free Outfall		R0,W0,C0
73.30	19.57	Free Outfall		R0,W0,C0
73.40	24.18	Free Outfall		R0,W0,C0
73.50	29.31	Free Outfall		R0,W0,C0
73.60	34.83	Free Outfall		R0,W0,C0

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
73.70	40.74	Free Outfall		R0,W0,C0
73.80	46.68	Free Outfall		R0,W0,C0
73.90	52.40	Free Outfall		R0,W0,C0
74.00	57.88	Free Outfall		R0,W0,C0

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 67.00 ft
Increment = .10 ft
Max. Elev.= 72.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Inlet Box	R1	--->	C1	71.500	72.000
Weir-Rectangular	W1	--->	C1	69.000	72.000
Culvert-Circular	C1	--->	TW	67.480	72.000
Inlet Box	R0	--->	C0	71.500	72.000
Weir-Rectangular	W0	--->	C0	69.000	72.000
Culvert-Circular	C0	--->	TW	68.200	72.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = R1
Structure Type    = Inlet Box
------------------------------------
# of Openings     =         1
Invert Elev.      =     71.50 ft
Orifice Area      =   12.0000 sq.ft
Orifice Coeff.    =      .600
Weir Length       =     12.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No
```

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =     69.00 ft
Weir Length       =      4.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)
```

```
OUTLET STRUCTURE INPUT DATA


Structure ID      = C1
Structure Type    = Culvert-Circular
------------------------------------
No. Barrels       =        1
Barrel Diameter   =    2.5000 ft
Upstream Invert   =     67.48 ft
Dnstream Invert   =     66.89 ft
Horiz. Length     =    130.00 ft
Barrel Length     =    130.00 ft
Barrel Slope      =    .00454 ft/ft

OUTLET CONTROL DATA...
Mannings n        =     .0130
Ke                =     .5000  (forward entrance loss)
Kb                =   .009217  (per ft of full flow)
Kr                =     .5000  (reverse entrance loss)
HW Convergence    =      .001  +/- ft

INLET CONTROL DATA...
Equation form     =        1
Inlet Control K   =     .0098
Inlet Control M   =    2.0000
Inlet Control c   =    .03980
Inlet Control Y   =     .6700
T1 ratio (HW/D)   =     1.158
T2 ratio (HW/D)   =     1.305
Slope Factor      =     -.500
```

```
Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =     70.37 ft  --->  Flow =     27.16 cfs
At T2 Elev =     70.74 ft  --->  Flow =     31.05 cfs
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = R0
Structure Type    = Inlet Box
------------------------------------
# of Openings     =         1
Invert Elev.      =     71.50 ft
Orifice Area      =   12.0000 sq.ft
Orifice Coeff.    =      .600
Weir Length       =     12.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No


Structure ID      = W0
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =     69.00 ft
Weir Length       =      4.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)
```

```
              OUTLET STRUCTURE INPUT DATA


              Structure ID      = C0
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =        1
              Barrel Diameter   =    2.5000 ft
              Upstream Invert   =     68.20 ft
              Dnstream Invert   =     66.25 ft
              Horiz. Length     =    140.00 ft
              Barrel Length     =    140.01 ft
              Barrel Slope      =    .01393 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .009217  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =        1
              Inlet Control K   =     .0018
              Inlet Control M   =    2.5000
              Inlet Control c   =    .03000
              Inlet Control Y   =     .7400
              T1 ratio (HW/D)   =     1.074
              T2 ratio (HW/D)   =     1.213
              Slope Factor      =     -.500

 Use unsubmerged inlet control Form 1 equ. below T1 elev.
 Use   submerged inlet control Form 1 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =     70.89 ft  --->  Flow =     27.16 cfs
 At T2 Elev =     71.23 ft  --->  Flow =     31.05 cfs


              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    40
              Min. TW tolerance =    .01 ft
              Max. TW tolerance =    .01 ft
              Min. HW tolerance =    .01 ft
              Max. HW tolerance =    .01 ft
              Min.  Q tolerance =    .00 cfs
              Max.  Q tolerance =    .00 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		-------- Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
67.00	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.10	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.20	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.30	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.40	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.48	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.50	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.60	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.70	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.80	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
67.90	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.00	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.10	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.20	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.30	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.40	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.50	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.60	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.70	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.80	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
68.90	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
69.00	.00	Free Outfall		(no Q: R1,W1,C1,R0,W0,C0)
69.10	.78	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
69.20	2.22	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
69.30	2.04	Free Outfall		W1,C1,W0 (no Q: R1,R0,C0)
69.40	6.26	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
69.50	4.38	Free Outfall		W1,C1,W0 (no Q: R1,R0,C0)
69.60	10.82	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
69.70	13.29	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
69.80	15.90	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
69.90	18.38	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.00	20.82	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.10	23.28	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.20	25.80	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.30	28.39	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.40	31.02	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.50	33.66	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.60	36.33	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
70.70	39.07	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.80	41.85	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
70.90	44.61	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.00	47.41	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.10	50.19	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.20	52.97	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.30	55.74	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.40	58.44	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.50	61.07	Free Outfall		W1,C1,W0,C0 (no Q: R1,R0)
71.60	64.38	Free Outfall		R1,W1,C1,R0,W0,C0
71.70	67.60	Free Outfall		R1,W1,C1,R0,W0,C0
71.80	70.76	Free Outfall		R1,W1,C1,R0,W0,C0
71.90	73.95	Free Outfall		R1,W1,C1,R0,W0,C0
72.00	76.83	Free Outfall		R1,W1,C1,R0,W0,C0

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 67.00 ft
Increment = .10 ft
Max. Elev.= 72.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Inlet Box	R0	--->	C0	70.500	72.000
Weir-Rectangular	W0	--->	C0	69.000	72.000
Culvert-Circular	C0	--->	TW	66.800	72.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = R0
Structure Type    = Inlet Box
------------------------------------
# of Openings     =         1
Invert Elev.      =     70.50 ft
Orifice Area      =   12.0000 sq.ft
Orifice Coeff.    =      .600
Weir Length       =     12.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No
```

```
Structure ID      = W0
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =     69.00 ft
Weir Length       =      4.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)
```

```
            OUTLET STRUCTURE INPUT DATA



            Structure ID      = C0
            Structure Type    = Culvert-Circular
            ------------------------------------
            No. Barrels       =         1
            Barrel Diameter   =    2.5000 ft
            Upstream Invert   =     66.80 ft
            Dnstream Invert   =     66.17 ft
            Horiz. Length     =    150.00 ft
            Barrel Length     =    150.00 ft
            Barrel Slope      =    .00420 ft/ft

            OUTLET CONTROL DATA...
            Mannings n        =     .0130
            Ke                =     .2000  (forward entrance loss)
            Kb                =   .009217  (per ft of full flow)
            Kr                =     .2000  (reverse entrance loss)
            HW Convergence    =      .001  +/- ft

            INLET CONTROL DATA...
            Equation form     =         1
            Inlet Control K   =     .0018
            Inlet Control M   =    2.5000
            Inlet Control c   =    .03000
            Inlet Control Y   =     .7400
            T1 ratio (HW/D)   =     1.079
            T2 ratio (HW/D)   =     1.218
            Slope Factor      =     -.500

 Use unsubmerged inlet control Form 1 equ. below T1 elev.
 Use   submerged inlet control Form 1 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =     69.50 ft  --->  Flow =     27.16 cfs
 At T2 Elev =     69.84 ft  --->  Flow =     31.05 cfs



            Structure ID      = TW
            Structure Type    = TW SETUP, DS Channel
            ------------------------------------
            FREE OUTFALL CONDITIONS SPECIFIED

            CONVERGENCE TOLERANCES...
            Maximum Iterations=    40
            Min. TW tolerance =    .01 ft
            Max. TW tolerance =    .01 ft
            Min. HW tolerance =    .01 ft
            Max. HW tolerance =    .01 ft
            Min.  Q tolerance =    .00 cfs
            Max.  Q tolerance =    .00 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		-------- Converge --------		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
67.00	.00	Free Outfall		(no Q: R0,W0,C0)
67.10	.00	Free Outfall		(no Q: R0,W0,C0)
67.20	.00	Free Outfall		(no Q: R0,W0,C0)
67.30	.00	Free Outfall		(no Q: R0,W0,C0)
67.40	.00	Free Outfall		(no Q: R0,W0,C0)
67.50	.00	Free Outfall		(no Q: R0,W0,C0)
67.60	.00	Free Outfall		(no Q: R0,W0,C0)
67.70	.00	Free Outfall		(no Q: R0,W0,C0)
67.80	.00	Free Outfall		(no Q: R0,W0,C0)
67.90	.00	Free Outfall		(no Q: R0,W0,C0)
68.00	.00	Free Outfall		(no Q: R0,W0,C0)
68.10	.00	Free Outfall		(no Q: R0,W0,C0)
68.20	.00	Free Outfall		(no Q: R0,W0,C0)
68.30	.00	Free Outfall		(no Q: R0,W0,C0)
68.40	.00	Free Outfall		(no Q: R0,W0,C0)
68.50	.00	Free Outfall		(no Q: R0,W0,C0)
68.60	.00	Free Outfall		(no Q: R0,W0,C0)
68.70	.00	Free Outfall		(no Q: R0,W0,C0)
68.80	.00	Free Outfall		(no Q: R0,W0,C0)
68.90	.00	Free Outfall		(no Q: R0,W0,C0)
69.00	.00	Free Outfall		(no Q: R0,W0,C0)
69.10	.39	Free Outfall		W0,C0 (no Q: R0)
69.20	1.11	Free Outfall		W0,C0 (no Q: R0)
69.30	2.04	Free Outfall		W0,C0 (no Q: R0)
69.40	3.14	Free Outfall		W0,C0 (no Q: R0)
69.50	4.38	Free Outfall		W0,C0 (no Q: R0)
69.60	5.76	Free Outfall		W0,C0 (no Q: R0)
69.70	7.26	Free Outfall		W0,C0 (no Q: R0)
69.80	8.88	Free Outfall		W0,C0 (no Q: R0)
69.90	10.59	Free Outfall		W0,C0 (no Q: R0)
70.00	12.39	Free Outfall		W0,C0 (no Q: R0)
70.10	14.31	Free Outfall		W0,C0 (no Q: R0)
70.20	16.31	Free Outfall		W0,C0 (no Q: R0)
70.30	18.37	Free Outfall		W0,C0 (no Q: R0)
70.40	20.37	Free Outfall		W0,C0 (no Q: R0)
70.50	22.22	Free Outfall		W0,C0 (no Q: R0)
70.60	24.89	Free Outfall		R0,W0,C0
70.70	28.05	Free Outfall		R0,W0,C0

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
70.80	31.17	Free Outfall		R0,W0,C0
70.90	33.75	Free Outfall		R0,W0,C0
71.00	35.83	Free Outfall		R0,W0,C0
71.10	37.65	Free Outfall		R0,W0,C0
71.20	39.20	Free Outfall		R0,W0,C0
71.30	40.46	Free Outfall		R0,W0,C0
71.40	41.47	Free Outfall		R0,W0,C0
71.50	42.30	Free Outfall		R0,C0 (no Q: W0)
71.60	42.95	Free Outfall		R0,C0 (no Q: W0)
71.70	43.59	Free Outfall		R0,C0 (no Q: W0)
71.80	44.23	Free Outfall		R0,C0 (no Q: W0)
71.90	44.86	Free Outfall		R0,C0 (no Q: W0)
72.00	45.49	Free Outfall		R0,C0 (no Q: W0)

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 65.25 ft
Increment = .10 ft
Max. Elev.= 70.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Inlet Box	R0	--->	C0	68.500	70.000
Weir-Rectangular	W0	--->	C0	67.250	70.000
Culvert-Circular	C0	--->	TW	63.750	70.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID      = R0
Structure Type    = Inlet Box
------------------------------------
# of Openings     =         1
Invert Elev.      =     68.50 ft
Orifice Area      =   12.0000 sq.ft
Orifice Coeff.    =      .600
Weir Length       =     12.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No


Structure ID      = W0
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =     67.25 ft
Weir Length       =      4.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)
```

```
              OUTLET STRUCTURE INPUT DATA


              Structure ID      = C0
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =        1
              Barrel Diameter   =    2.5000 ft
              Upstream Invert   =     63.75 ft
              Dnstream Invert   =     63.25 ft
              Horiz. Length     =     86.00 ft
              Barrel Length     =     86.00 ft
              Barrel Slope      =    .00581 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .009217  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =        1
              Inlet Control K   =     .0018
              Inlet Control M   =    2.5000
              Inlet Control c   =    .03000
              Inlet Control Y   =     .7400
              T1 ratio (HW/D)   =     1.079
              T2 ratio (HW/D)   =     1.217
              Slope Factor      =     -.500

 Use unsubmerged inlet control Form 1 equ. below T1 elev.
 Use   submerged inlet control Form 1 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =     66.45 ft  --->  Flow =     27.16 cfs
 At T2 Elev =     66.79 ft  --->  Flow =     31.05 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    40
              Min. TW tolerance =    .01 ft
              Max. TW tolerance =    .01 ft
              Min. HW tolerance =    .01 ft
              Max. HW tolerance =    .01 ft
              Min.  Q tolerance =    .00 cfs
              Max.  Q tolerance =    .00 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
65.25	.00	Free Outfall		(no Q: R0,W0,C0)
65.35	.00	Free Outfall		(no Q: R0,W0,C0)
65.45	.00	Free Outfall		(no Q: R0,W0,C0)
65.55	.00	Free Outfall		(no Q: R0,W0,C0)
65.65	.00	Free Outfall		(no Q: R0,W0,C0)
65.75	.00	Free Outfall		(no Q: R0,W0,C0)
65.85	.00	Free Outfall		(no Q: R0,W0,C0)
65.95	.00	Free Outfall		(no Q: R0,W0,C0)
66.05	.00	Free Outfall		(no Q: R0,W0,C0)
66.15	.00	Free Outfall		(no Q: R0,W0,C0)
66.25	.00	Free Outfall		(no Q: R0,W0,C0)
66.35	.00	Free Outfall		(no Q: R0,W0,C0)
66.45	.00	Free Outfall		(no Q: R0,W0,C0)
66.55	.00	Free Outfall		(no Q: R0,W0,C0)
66.65	.00	Free Outfall		(no Q: R0,W0,C0)
66.75	.00	Free Outfall		(no Q: R0,W0,C0)
66.85	.00	Free Outfall		(no Q: R0,W0,C0)
66.95	.00	Free Outfall		(no Q: R0,W0,C0)
67.05	.00	Free Outfall		(no Q: R0,W0,C0)
67.15	.00	Free Outfall		(no Q: R0,W0,C0)
67.25	.00	Free Outfall		(no Q: R0,W0,C0)
67.35	.39	Free Outfall		W0,C0 (no Q: R0)
67.45	1.11	Free Outfall		W0,C0 (no Q: R0)
67.55	2.04	Free Outfall		W0,C0 (no Q: R0)
67.65	3.14	Free Outfall		W0,C0 (no Q: R0)
67.75	4.38	Free Outfall		W0,C0 (no Q: R0)
67.85	5.77	Free Outfall		W0,C0 (no Q: R0)
67.95	7.27	Free Outfall		W0,C0 (no Q: R0)
68.05	8.88	Free Outfall		W0,C0 (no Q: R0)
68.15	10.59	Free Outfall		W0,C0 (no Q: R0)
68.25	12.41	Free Outfall		W0,C0 (no Q: R0)
68.35	14.32	Free Outfall		W0,C0 (no Q: R0)
68.45	16.31	Free Outfall		W0,C0 (no Q: R0)
68.50	17.34	Free Outfall		W0,C0 (no Q: R0)
68.55	18.80	Free Outfall		R0,W0,C0
68.65	22.70	Free Outfall		R0,W0,C0
68.75	27.44	Free Outfall		R0,W0,C0
68.85	32.81	Free Outfall		R0,W0,C0

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
68.95	38.34	Free Outfall		R0,W0,C0
69.05	42.40	Free Outfall		R0,W0,C0
69.15	45.75	Free Outfall		R0,W0,C0
69.25	48.57	Free Outfall		R0,W0,C0
69.35	50.90	Free Outfall		R0,W0,C0
69.45	52.77	Free Outfall		R0,W0,C0
69.55	54.20	Free Outfall		R0,W0,C0
69.65	55.30	Free Outfall		R0,W0,C0
69.75	56.15	Free Outfall		R0,W0,C0
69.85	56.82	Free Outfall		R0,W0,C0
69.95	57.49	Free Outfall		R0,C0 (no Q: W0)
70.00	57.83	Free Outfall		R0,C0 (no Q: W0)

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 65.00 ft
Increment = .10 ft
Max. Elev.= 70.50 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	C0	68.810	70.500
Inlet Box	R0	--->	C0	70.000	70.500
Orifice-Circular	O0	--->	C0	65.300	70.500
Culvert-Circular	C0	--->	TW	65.000	70.500
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA



Structure ID      = W0
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =     68.81 ft
Weir Length       =      4.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)



Structure ID      = R0
Structure Type    = Inlet Box
------------------------------------
# of Openings     =         1
Invert Elev.      =     70.00 ft
Orifice Area      =   12.0000 sq.ft
Orifice Coeff.    =      .600
Weir Length       =     12.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No


Structure ID      = O0
Structure Type    = Orifice-Circular
------------------------------------
# of Openings     =         1
Invert Elev.      =     65.30 ft
Diameter          =     .3300 ft
Orifice Coeff.    =      .600
```

```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C0
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    3.0000 ft
              Upstream Invert   =     65.00 ft
              Dnstream Invert   =     63.95 ft
              Horiz. Length     =     48.00 ft
              Barrel Length     =     48.01 ft
              Barrel Slope      =    .02187 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .007228  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =         1
              Inlet Control K   =     .0018
              Inlet Control M   =    2.5000
              Inlet Control c   =    .03000
              Inlet Control Y   =     .7400
              T1 ratio (HW/D)   =     1.071
              T2 ratio (HW/D)   =     1.209
              Slope Factor      =     -.500

 Use unsubmerged inlet control Form 1 equ. below T1 elev.
 Use   submerged inlet control Form 1 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =     68.21 ft  --->  Flow =     42.85 cfs
 At T2 Elev =     68.63 ft  --->  Flow =     48.97 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    40
              Min. TW tolerance =    .01 ft
              Max. TW tolerance =    .01 ft
              Min. HW tolerance =    .01 ft
              Max. HW tolerance =    .01 ft
              Min.  Q tolerance =    .00 cfs
              Max.  Q tolerance =    .00 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
65.00	.00	Free Outfall		(no Q: W0,R0,O0,C0)
65.10	.00	Free Outfall		(no Q: W0,R0,O0,C0)
65.20	.00	Free Outfall		(no Q: W0,R0,O0,C0)
65.30	.00	Free Outfall		(no Q: W0,R0,O0,C0)
65.40	.02	Free Outfall		O0,C0 (no Q: W0,R0)
65.50	.07	Free Outfall		O0,C0 (no Q: W0,R0)
65.60	.14	Free Outfall		O0,C0 (no Q: W0,R0)
65.70	.20	Free Outfall		O0,C0 (no Q: W0,R0)
65.80	.24	Free Outfall		O0,C0 (no Q: W0,R0)
65.90	.27	Free Outfall		O0,C0 (no Q: W0,R0)
66.00	.30	Free Outfall		O0,C0 (no Q: W0,R0)
66.10	.33	Free Outfall		O0,C0 (no Q: W0,R0)
66.20	.35	Free Outfall		O0,C0 (no Q: W0,R0)
66.30	.38	Free Outfall		O0,C0 (no Q: W0,R0)
66.40	.40	Free Outfall		O0,C0 (no Q: W0,R0)
66.50	.42	Free Outfall		O0,C0 (no Q: W0,R0)
66.60	.44	Free Outfall		O0,C0 (no Q: W0,R0)
66.70	.46	Free Outfall		O0,C0 (no Q: W0,R0)
66.80	.48	Free Outfall		O0,C0 (no Q: W0,R0)
66.90	.49	Free Outfall		O0,C0 (no Q: W0,R0)
67.00	.51	Free Outfall		O0,C0 (no Q: W0,R0)
67.10	.53	Free Outfall		O0,C0 (no Q: W0,R0)
67.20	.54	Free Outfall		O0,C0 (no Q: W0,R0)
67.30	.56	Free Outfall		O0,C0 (no Q: W0,R0)
67.40	.57	Free Outfall		O0,C0 (no Q: W0,R0)
67.50	.59	Free Outfall		O0,C0 (no Q: W0,R0)
67.60	.60	Free Outfall		O0,C0 (no Q: W0,R0)
67.70	.61	Free Outfall		O0,C0 (no Q: W0,R0)
67.80	.63	Free Outfall		O0,C0 (no Q: W0,R0)
67.90	.64	Free Outfall		O0,C0 (no Q: W0,R0)
68.00	.66	Free Outfall		O0,C0 (no Q: W0,R0)
68.10	.67	Free Outfall		O0,C0 (no Q: W0,R0)
68.20	.68	Free Outfall		O0,C0 (no Q: W0,R0)
68.30	.69	Free Outfall		O0,C0 (no Q: W0,R0)
68.40	.71	Free Outfall		O0,C0 (no Q: W0,R0)
68.50	.72	Free Outfall		O0,C0 (no Q: W0,R0)
68.60	.73	Free Outfall		O0,C0 (no Q: W0,R0)
68.70	.74	Free Outfall		O0,C0 (no Q: W0,R0)

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
68.80	.75	Free Outfall		O0,C0 (no Q: W0,R0)
68.81	.75	Free Outfall		O0,C0 (no Q: W0,R0)
68.90	1.10	Free Outfall		W0,O0,C0 (no Q: R0)
69.00	1.78	Free Outfall		W0,O0,C0 (no Q: R0)
69.10	2.69	Free Outfall		W0,O0,C0 (no Q: R0)
69.20	3.77	Free Outfall		W0,O0,C0 (no Q: R0)
69.30	5.00	Free Outfall		W0,O0,C0 (no Q: R0)
69.40	6.36	Free Outfall		W0,O0,C0 (no Q: R0)
69.50	7.84	Free Outfall		W0,O0,C0 (no Q: R0)
69.60	9.45	Free Outfall		W0,O0,C0 (no Q: R0)
69.70	11.15	Free Outfall		W0,O0,C0 (no Q: R0)
69.80	12.95	Free Outfall		W0,O0,C0 (no Q: R0)
69.90	14.83	Free Outfall		W0,O0,C0 (no Q: R0)
70.00	16.81	Free Outfall		W0,O0,C0 (no Q: R0)
70.10	20.05	Free Outfall		W0,R0,O0,C0
70.20	24.33	Free Outfall		W0,R0,O0,C0
70.30	29.34	Free Outfall		W0,R0,O0,C0
70.40	34.90	Free Outfall		W0,R0,O0,C0
70.50	40.98	Free Outfall		W0,R0,O0,C0

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN EX IN 2
Outflow HYG file = NONE STORED - BASIN EX OUT 2

Pond Node Data = BASIN EX
Pond Volume Data = BASIN EX
Pond Outlet Data = Outlet Existing

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 65.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
65.00	.00	.000	86301	.00	.00	.00
65.10	.00	.198	86610	.00	.00	48.03
65.20	.00	.398	86919	.00	.00	96.23
65.30	.00	.598	87229	.00	.00	144.61
65.40	.02	.798	87539	.00	.02	193.17
65.50	.07	.999	87850	.00	.07	241.94
65.60	.14	1.202	88162	.00	.14	290.90
65.70	.20	1.404	88474	.00	.20	340.03
65.80	.24	1.608	88786	.00	.24	389.31
65.90	.27	1.812	89099	.00	.27	438.76
66.00	.30	2.017	89413	.00	.30	488.37
66.10	.33	2.222	89727	.00	.33	538.16
66.20	.35	2.429	90042	.00	.35	588.12
66.30	.38	2.636	90358	.00	.38	638.26
66.40	.40	2.844	90673	.00	.40	688.56
66.50	.42	3.052	90990	.00	.42	739.04
66.60	.44	3.261	91307	.00	.44	789.70
66.70	.46	3.471	91624	.00	.46	840.53
66.80	.48	3.682	91943	.00	.48	891.55
66.90	.49	3.894	92261	.00	.49	942.73

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN EX IN 2
Outflow HYG file = NONE STORED - BASIN EX OUT 2

Pond Node Data = BASIN EX
Pond Volume Data = BASIN EX
Pond Outlet Data = Outlet Existing

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 65.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
67.00	.51	4.106	92580	.00	.51	994.09
67.10	.53	4.319	92900	.00	.53	1045.63
67.20	.54	4.532	93220	.00	.54	1097.35
67.30	.56	4.747	93541	.00	.56	1149.24
67.40	.57	4.962	93863	.00	.57	1201.31
67.50	.59	5.178	94185	.00	.59	1253.56
67.60	.60	5.394	94507	.00	.60	1305.99
67.70	.61	5.611	94830	.00	.61	1358.60
67.80	.63	5.830	95154	.00	.63	1411.39
67.90	.64	6.048	95478	.00	.64	1464.35
68.00	.66	6.268	95803	.00	.66	1517.50
68.10	.67	6.488	96128	.00	.67	1570.82
68.20	.68	6.709	96454	.00	.68	1624.33
68.30	.69	6.931	96780	.00	.69	1678.02
68.40	.71	7.154	97107	.00	.71	1731.89
68.50	.72	7.377	97435	.00	.72	1785.94
68.60	.73	7.601	97763	.00	.73	1840.18
68.70	.74	7.826	98091	.00	.74	1894.59
68.80	.75	8.051	98420	.00	.75	1949.19
68.81	.75	8.074	98453	.00	.75	1954.66

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN EX IN 2
Outflow HYG file = NONE STORED - BASIN EX OUT 2

Pond Node Data = BASIN EX
Pond Volume Data = BASIN EX
Pond Outlet Data = Outlet Existing

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 65.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
68.90	1.10	8.278	98750	.00	1.10	2004.31
69.00	1.78	8.505	99080	.00	1.78	2059.94
69.10	2.69	8.733	99411	.00	2.69	2115.99
69.20	3.77	8.961	99742	.00	3.77	2172.39
69.30	5.00	9.191	100074	.00	5.00	2229.12
69.40	6.36	9.421	100407	.00	6.36	2286.17
69.50	7.84	9.652	100740	.00	7.84	2343.53
69.60	9.45	9.883	101073	.00	9.45	2401.19
69.70	11.15	10.116	101407	.00	11.15	2459.13
69.80	12.95	10.349	101742	.00	12.95	2517.37
69.90	14.83	10.583	102077	.00	14.83	2575.87
70.00	16.81	10.818	102413	.00	16.81	2634.65
70.10	20.05	11.053	102749	.00	20.05	2694.88
70.20	24.33	11.289	103086	.00	24.33	2756.33
70.30	29.34	11.526	103424	.00	29.34	2818.71
70.40	34.90	11.764	103762	.00	34.90	2881.82
70.50	40.98	12.003	104100	.00	40.98	2945.64

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN EX IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ROUTE 50	BASIN PROP 4 IN		ROUTE 50	1
ADDLINK 70	JUNC 10		JUNC 10	1
ADDLINK 90	P-5 PERVIOUS		P-5 PERVIOUS	1
ADDLINK 80	P-5 IMPERVIOUS		P-5 IMPERVIOUS	1

INFLOWS TO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	ROUTE 50	1	.361	1.2000	9.39
	JUNC 10	1	.168	1.6000	2.89
	P-5 PERVIOUS	1	.000	.1000	.00
	P-5 IMPERVIOUS	1	.408	1.1000	11.11

TOTAL FLOW INTO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN EX IN	1	.938	1.2000	17.76

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN EX IN
HYG Tag = 1

Peak Discharge = 17.76 cfs
Time to Peak = 1.2000 hrs
HYG Volume = .938 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.3000	.00	.06	.26	.57	.87
.8000	1.28	2.51	6.99	13.14	17.76
1.3000	14.45	11.59	9.23	7.81	6.69
1.8000	5.65	4.32	3.23	2.27	1.54
2.3000	1.02	.71	.49	.34	.24
2.8000	.16	.11	.08	.05	.04
3.3000	.03	.02	.01	.01	.01
3.8000	.00	.00	.00		

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN EX IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ROUTE 50	BASIN PROP 4 IN		ROUTE 50	2
ADDLINK 70	JUNC 10		JUNC 10	2
ADDLINK 90	P-5 PERVIOUS		P-5 PERVIOUS	2
ADDLINK 80	P-5 IMPERVIOUS		P-5 IMPERVIOUS	2

INFLOWS TO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	ROUTE 50	2	1.362	12.2000	12.90
	JUNC 10	2	2.540	12.2000	14.89
	P-5 PERVIOUS	2	.001	20.3000	.00
	P-5 IMPERVIOUS	2	1.205	12.1000	11.37

TOTAL FLOW INTO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN EX IN	2	5.108	12.2000	37.32

```
TOTAL NODE INFLOW...
HYG file =
HYG ID   = BASIN EX     IN
HYG Tag  =      2
-----------------------------------
Peak Discharge =       37.32 cfs
Time to Peak   =     12.2000 hrs
HYG Volume     =       5.108 ac-ft
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```

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
1.3000	.00	.00	.01	.01	.02
1.8000	.02	.02	.03	.03	.04
2.3000	.04	.04	.05	.05	.06
2.8000	.06	.06	.07	.07	.08
3.3000	.08	.08	.09	.09	.10
3.8000	.10	.10	.11	.11	.12
4.3000	.12	.12	.13	.13	.13
4.8000	.14	.14	.15	.15	.15
5.3000	.16	.16	.16	.17	.17
5.8000	.17	.18	.18	.19	.19
6.3000	.20	.21	.21	.22	.23
6.8000	.24	.25	.25	.26	.27
7.3000	.28	.29	.30	.30	.31
7.8000	.32	.33	.34	.35	.36
8.3000	.38	.40	.41	.43	.45
8.8000	.47	.49	.50	.52	.57
9.3000	.78	.95	1.13	1.26	1.34
9.8000	1.41	1.46	1.51	1.56	1.63
10.3000	1.70	1.77	1.85	1.94	2.02
10.8000	2.11	2.20	2.29	2.41	2.59
11.3000	2.84	3.12	3.81	4.96	7.32
11.8000	10.64	14.96	24.95	35.65	37.32
12.3000	30.72	24.51	19.27	17.45	11.60
12.8000	9.98	9.21	8.69	8.12	7.33
13.3000	6.84	6.51	6.26	6.05	5.86
13.8000	5.69	5.51	5.34	5.18	5.04
14.3000	4.92	4.81	4.70	4.59	4.49
14.8000	4.38	4.28	4.18	4.08	3.98
15.3000	3.87	3.77	3.67	3.57	3.47
15.8000	3.37	3.26	3.16	3.07	2.98
16.3000	2.90	2.83	2.77	2.71	2.65

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.8000	2.59	2.53	2.48	2.42	2.37
17.3000	2.32	2.26	2.21	2.16	2.11
17.8000	2.07	2.02	1.97	1.92	1.88
18.3000	1.84	1.80	1.77	1.74	1.72
18.8000	1.69	1.67	1.65	1.62	1.60
19.3000	1.58	1.56	1.54	1.52	1.50
19.8000	1.48	1.46	1.44	1.42	1.40
20.3000	1.39	1.37	1.35	1.34	1.32
20.8000	1.31	1.29	1.28	1.26	1.25
21.3000	1.23	1.22	1.21	1.19	1.18
21.8000	1.17	1.16	1.14	1.13	1.12
22.3000	1.10	1.09	1.08	1.07	1.05
22.8000	1.04	1.03	1.02	1.01	.99
23.3000	.98	.97	.96	.95	.94
23.8000	.93	.92	.91	.81	.69
24.3000	.60	.52	.46	.42	.38
24.8000	.36	.34	.32	.31	.29
25.3000	.28	.27	.26	.26	.25
25.8000	.24	.23	.23	.22	.21
26.3000	.21	.20	.20	.19	.18
26.8000	.18	.17	.17	.16	.16
27.3000	.15	.15	.15	.14	.14
27.8000	.13	.13	.13	.12	.12
28.3000	.12	.11	.11	.11	.10
28.8000	.10	.10	.09	.09	.09
29.3000	.09	.08	.08	.08	.08
29.8000	.08	.08	.07	.07	.07
30.3000	.07	.07	.07	.07	.07
30.8000	.07	.07	.06	.06	.06
31.3000	.06	.06	.06	.06	.06
31.8000	.06	.06	.06	.06	.05
32.3000	.05	.05	.05	.05	.05
32.8000	.05	.05	.05	.05	.05
33.3000	.05	.05	.05	.04	.04
33.8000	.04	.04	.04	.04	.04
34.3000	.04	.04	.04	.04	.04
34.8000	.04	.04	.04	.04	.04
35.3000	.04	.03	.03	.03	.03
35.8000	.03	.03	.03	.03	.03
36.3000	.03	.03	.03	.03	.03
36.8000	.03	.03	.03	.03	.03
37.3000	.03	.03	.03	.03	.03
37.8000	.02	.02	.02	.02	.02
38.3000	.02	.02	.02	.02	.02
38.8000	.02	.02	.02	.02	.02

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
39.3000	.02	.02	.02	.02	.02
39.8000	.02	.02	.02	.02	.02
40.3000	.02	.02	.02	.02	.02
40.8000	.02	.02	.02	.02	.02
41.3000	.02	.01	.01	.01	.01
41.8000	.01	.01	.01	.01	.01
42.3000	.01	.01	.01	.01	.01
42.8000	.01	.01	.01	.01	.01
43.3000	.01	.01	.01	.01	.01
43.8000	.01	.01	.01	.01	.01
44.3000	.01	.01	.01	.01	.01
44.8000	.01	.01	.01	.01	.01
45.3000	.01	.01	.01	.01	.01
45.8000	.01	.01	.01	.01	.01
46.3000	.01	.01	.01	.01	.01
46.8000	.01	.01	.01	.01	.01
47.3000	.01	.01	.01	.01	.01
47.8000	.01	.01	.01	.01	.01
48.3000	.01	.01	.01	.01	.01
48.8000	.01	.01	.01	.01	.00
49.3000	.00	.00	.00	.00	.00
49.8000	.00	.00	.00	.00	.00
50.3000	.00	.00	.00	.00	.00
50.8000	.00	.00	.00	.00	.00
51.3000	.00	.00	.00	.00	.00
51.8000	.00	.00	.00	.00	.00
52.3000	.00	.00	.00	.00	.00
52.8000	.00				

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN EX IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ROUTE 50	BASIN PROP 4 IN		ROUTE 50	10
ADDLINK 70	JUNC 10		JUNC 10	10
ADDLINK 90	P-5 PERVIOUS		P-5 PERVIOUS	10
ADDLINK 80	P-5 IMPERVIOUS		P-5 IMPERVIOUS	10

INFLOWS TO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	ROUTE 50	10	2.233	12.2000	20.20
	JUNC 10	10	4.923	12.2000	26.51
	P-5 PERVIOUS	10	.064	12.5000	.14
	P-5 IMPERVIOUS	10	1.869	12.1000	17.33

TOTAL FLOW INTO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN EX IN	10	9.089	12.2000	61.24

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN EX IN
HYG Tag = 10

Peak Discharge = 61.24 cfs
Time to Peak = 12.2000 hrs
HYG Volume = 9.089 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.8000	.00	.00	.01	.02	.03
1.3000	.04	.04	.05	.06	.07
1.8000	.07	.08	.09	.09	.10
2.3000	.11	.11	.12	.13	.13
2.8000	.14	.15	.15	.16	.16
3.3000	.17	.18	.18	.19	.19
3.8000	.20	.21	.21	.22	.22
4.3000	.23	.23	.24	.24	.25
4.8000	.25	.26	.27	.27	.28
5.3000	.28	.29	.29	.30	.30
5.8000	.31	.31	.32	.32	.33
6.3000	.34	.35	.37	.38	.39
6.8000	.40	.41	.43	.44	.45
7.3000	.46	.48	.56	.74	.87
7.8000	1.00	1.11	1.18	1.23	1.28
8.3000	1.34	1.39	1.45	1.51	1.57
8.8000	1.64	1.70	1.76	1.82	1.89
9.3000	1.95	2.01	2.08	2.15	2.21
9.8000	2.28	2.34	2.47	2.86	3.18
10.3000	3.46	3.78	4.19	4.55	4.85
10.8000	5.17	5.43	5.67	5.96	6.39
11.3000	6.97	7.64	8.38	9.67	12.24
11.8000	19.09	24.97	41.58	58.73	61.24
12.3000	52.66	43.82	33.88	27.00	24.40
12.8000	20.37	17.38	15.91	14.86	14.15
13.3000	13.58	13.12	12.73	12.14	11.48
13.8000	10.94	10.48	10.04	9.64	9.29
14.3000	8.97	8.69	8.43	8.18	7.95
14.8000	7.71	7.49	7.28	7.06	6.86
15.3000	6.65	6.45	6.25	6.06	5.87
15.8000	5.69	5.52	5.35	5.18	5.02

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.3000	4.88	4.74	4.62	4.50	4.39
16.8000	4.29	4.19	4.09	4.00	3.90
17.3000	3.81	3.72	3.63	3.54	3.45
17.8000	3.36	3.27	3.19	3.10	3.03
18.3000	2.97	2.92	2.87	2.82	2.78
18.8000	2.74	2.70	2.66	2.62	2.58
19.3000	2.55	2.51	2.48	2.44	2.41
19.8000	2.38	2.34	2.31	2.28	2.25
20.3000	2.22	2.20	2.17	2.15	2.12
20.8000	2.09	2.07	2.05	2.03	2.01
21.3000	1.99	1.97	1.95	1.93	1.91
21.8000	1.89	1.87	1.85	1.83	1.81
22.3000	1.79	1.77	1.75	1.73	1.72
22.8000	1.70	1.68	1.66	1.64	1.62
23.3000	1.60	1.59	1.57	1.55	1.53
23.8000	1.51	1.49	1.48	1.30	1.10
24.3000	.93	.80	.70	.62	.57
24.8000	.52	.48	.45	.43	.41
25.3000	.39	.38	.37	.36	.34
25.8000	.33	.32	.31	.30	.30
26.3000	.29	.28	.27	.26	.26
26.8000	.25	.24	.23	.23	.22
27.3000	.21	.21	.20	.20	.19
27.8000	.19	.18	.18	.17	.17
28.3000	.16	.16	.15	.15	.14
28.8000	.14	.13	.13	.13	.12
29.3000	.12	.12	.11	.11	.11
29.8000	.10	.10	.10	.10	.09
30.3000	.09	.09	.08	.08	.08
30.8000	.08	.08	.08	.07	.07
31.3000	.07	.07	.07	.07	.07
31.8000	.07	.07	.07	.06	.06
32.3000	.06	.06	.06	.06	.06
32.8000	.06	.06	.06	.06	.06
33.3000	.05	.05	.05	.05	.05
33.8000	.05	.05	.05	.05	.05
34.3000	.05	.05	.05	.05	.04
34.8000	.04	.04	.04	.04	.04
35.3000	.04	.04	.04	.04	.04
35.8000	.04	.04	.04	.04	.04
36.3000	.04	.04	.03	.03	.03
36.8000	.03	.03	.03	.03	.03
37.3000	.03	.03	.03	.03	.03
37.8000	.03	.03	.03	.03	.03
38.3000	.03	.03	.03	.03	.03

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
38.8000	.03	.02	.02	.02	.02
39.3000	.02	.02	.02	.02	.02
39.8000	.02	.02	.02	.02	.02
40.3000	.02	.02	.02	.02	.02
40.8000	.02	.02	.02	.02	.02
41.3000	.02	.02	.02	.02	.02
41.8000	.02	.02	.02	.02	.02
42.3000	.02	.02	.01	.01	.01
42.8000	.01	.01	.01	.01	.01
43.3000	.01	.01	.01	.01	.01
43.8000	.01	.01	.01	.01	.01
44.3000	.01	.01	.01	.01	.01
44.8000	.01	.01	.01	.01	.01
45.3000	.01	.01	.01	.01	.01
45.8000	.01	.01	.01	.01	.01
46.3000	.01	.01	.01	.01	.01
46.8000	.01	.01	.01	.01	.01
47.3000	.01	.01	.01	.01	.01
47.8000	.01	.01	.01	.01	.01
48.3000	.01	.01	.01	.01	.01
48.8000	.01	.01	.01	.01	.01
49.3000	.01	.01	.01	.01	.01
49.8000	.01	.01	.01	.01	.01
50.3000	.00	.00	.00	.00	.00
50.8000	.00	.00	.00	.00	.00
51.3000	.00	.00	.00	.00	.00
51.8000	.00	.00	.00	.00	.00
52.3000	.00	.00	.00	.00	.00
52.8000	.00	.00	.00	.00	.00
53.3000	.00	.00	.00	.00	.00
53.8000	.00	.00			

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN EX IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ROUTE 50	BASIN PROP 4 IN		ROUTE 50	100
ADDLINK 70	JUNC 10		JUNC 10	100
ADDLINK 90	P-5 PERVIOUS		P-5 PERVIOUS	100
ADDLINK 80	P-5 IMPERVIOUS		P-5 IMPERVIOUS	100

INFLOWS TO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	ROUTE 50	100	4.064	12.1000	36.96
	JUNC 10	100	10.056	12.3000	69.06
	P-5 PERVIOUS	100	.410	12.1000	3.60
	P-5 IMPERVIOUS	100	3.169	12.1000	28.93

TOTAL FLOW INTO: BASIN EX IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN EX IN	100	17.698	12.2000	129.73

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN EX IN
HYG Tag = 100

Peak Discharge = 129.73 cfs
Time to Peak = 12.2000 hrs
HYG Volume = 17.698 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.5000	.00	.01	.03	.05	.07
1.0000	.10	.12	.13	.15	.17
1.5000	.18	.19	.20	.21	.22
2.0000	.23	.24	.25	.26	.27
2.5000	.28	.29	.30	.31	.32
3.0000	.33	.34	.35	.36	.37
3.5000	.38	.39	.40	.41	.41
4.0000	.42	.43	.44	.45	.46
4.5000	.46	.47	.48	.49	.50
5.0000	.50	.51	.52	.59	.77
5.5000	.91	1.05	1.15	1.21	1.25
6.0000	1.27	1.30	1.33	1.37	1.41
6.5000	1.45	1.49	1.54	1.58	1.63
7.0000	1.67	1.72	1.76	1.81	1.86
7.5000	1.90	1.95	1.99	2.04	2.09
8.0000	2.30	2.60	2.85	3.07	3.29
8.5000	3.61	3.92	4.18	4.41	4.65
9.0000	4.85	5.04	5.22	5.39	5.56
9.5000	5.73	5.90	6.08	6.25	6.42
10.0000	6.59	6.77	7.01	7.28	7.60
10.5000	7.99	8.45	8.92	9.33	9.75
11.0000	10.17	10.70	11.53	13.55	15.06
11.5000	16.70	19.86	26.70	34.27	50.92
12.0000	80.63	120.39	129.73	116.79	99.16
12.5000	80.03	62.29	47.01	39.24	33.63
13.0000	30.54	28.74	24.36	22.74	21.46
13.5000	20.66	19.91	19.18	18.47	17.78
14.0000	17.09	16.45	15.88	15.38	14.93
14.5000	14.50	14.11	13.78	13.46	13.15
15.0000	12.85	12.57	12.31	12.05	11.55
15.5000	11.04	10.62	10.25	9.90	9.56

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.0000	9.24	8.93	8.65	8.41	8.19
16.5000	7.99	7.80	7.62	7.44	7.27
17.0000	7.10	6.93	6.77	6.60	6.44
17.5000	6.29	6.14	5.99	5.84	5.69
18.0000	5.54	5.41	5.29	5.19	5.10
18.5000	5.02	4.94	4.86	4.80	4.73
19.0000	4.67	4.60	4.54	4.48	4.43
19.5000	4.37	4.31	4.25	4.20	4.15
20.0000	4.09	4.04	3.99	3.95	3.90
20.5000	3.86	3.81	3.77	3.73	3.69
21.0000	3.65	3.61	3.58	3.54	3.51
21.5000	3.47	3.43	3.40	3.37	3.33
22.0000	3.30	3.26	3.23	3.19	3.16
22.5000	3.13	3.10	3.06	3.03	3.00
23.0000	2.96	2.93	2.90	2.86	2.83
23.5000	2.80	2.77	2.74	2.70	2.67
24.0000	2.64	2.25	1.86	1.57	1.34
24.5000	1.16	1.03	.94	.86	.80
25.0000	.75	.70	.67	.63	.60
25.5000	.58	.55	.53	.51	.48
26.0000	.46	.45	.43	.41	.40
26.5000	.39	.37	.36	.35	.34
27.0000	.33	.32	.31	.31	.30
27.5000	.29	.28	.27	.26	.26
28.0000	.25	.24	.24	.23	.22
28.5000	.22	.21	.20	.20	.19
29.0000	.19	.18	.18	.17	.17
29.5000	.16	.16	.15	.15	.14
30.0000	.14	.14	.13	.13	.12
30.5000	.12	.12	.11	.11	.11
31.0000	.10	.10	.10	.10	.09
31.5000	.09	.09	.09	.08	.08
32.0000	.08	.08	.08	.07	.07
32.5000	.07	.07	.07	.07	.07
33.0000	.07	.07	.07	.06	.06
33.5000	.06	.06	.06	.06	.06
34.0000	.06	.06	.06	.06	.06
34.5000	.05	.05	.05	.05	.05
35.0000	.05	.05	.05	.05	.05
35.5000	.05	.05	.05	.05	.04
36.0000	.04	.04	.04	.04	.04
36.5000	.04	.04	.04	.04	.04
37.0000	.04	.04	.04	.04	.04
37.5000	.04	.04	.03	.03	.03
38.0000	.03	.03	.03	.03	.03

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
38.5000	.03	.03	.03	.03	.03
39.0000	.03	.03	.03	.03	.03
39.5000	.03	.03	.03	.03	.03
40.0000	.03	.02	.02	.02	.02
40.5000	.02	.02	.02	.02	.02
41.0000	.02	.02	.02	.02	.02
41.5000	.02	.02	.02	.02	.02
42.0000	.02	.02	.02	.02	.02
42.5000	.02	.02	.02	.02	.02
43.0000	.02	.02	.02	.02	.02
43.5000	.02	.02	.01	.01	.01
44.0000	.01	.01	.01	.01	.01
44.5000	.01	.01	.01	.01	.01
45.0000	.01	.01	.01	.01	.01
45.5000	.01	.01	.01	.01	.01
46.0000	.01	.01	.01	.01	.01
46.5000	.01	.01	.01	.01	.01
47.0000	.01	.01	.01	.01	.01
47.5000	.01	.01	.01	.01	.01
48.0000	.01	.01	.01	.01	.01
48.5000	.01	.01	.01	.01	.01
49.0000	.01	.01	.01	.01	.01
49.5000	.01	.01	.01	.01	.01
50.0000	.01	.01	.01	.01	.01
50.5000	.01	.01	.01	.01	.01
51.0000	.01	.01	.01	.01	.01
51.5000	.00	.00	.00	.00	.00
52.0000	.00	.00	.00	.00	.00
52.5000	.00	.00	.00	.00	.00
53.0000	.00	.00	.00	.00	.00
53.5000	.00	.00	.00	.00	.00
54.0000	.00	.00	.00	.00	.00
54.5000	.00	.00	.00	.00	.00
55.0000	.00	.00			

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN EX     IN  1
 Outflow HYG file = NONE STORED - BASIN EX     OUT 1

 Pond Node   Data = BASIN EX
 Pond Volume Data = BASIN EX
 Pond Outlet Data = Outlet Existing

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    65.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     17.76 cfs    at    1.2000 hrs
 Peak Outflow      =       .05 cfs    at    2.4000 hrs
 -----------------------------------------------------
 Peak Elevation    =     65.47 ft
 Peak Storage =           .932 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .938
- Infiltration =        .000
- HYG Vol OUT  =        .307
- Retained Vol =        .631
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.005% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN EX     IN  2
 Outflow HYG file = NONE STORED - BASIN EX     OUT 2

 Pond Node   Data = BASIN EX
 Pond Volume Data = BASIN EX
 Pond Outlet Data = Outlet Existing

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    65.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ======================================================
 Peak Inflow       =     37.32 cfs    at   12.2000 hrs
 Peak Outflow      =       .54 cfs    at   23.2000 hrs
 ------------------------------------------------------
 Peak Elevation    =     67.18 ft
 Peak Storage =          4.487 ac-ft
 ======================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       5.108
- Infiltration =        .000
- HYG Vol OUT  =       4.477
- Retained Vol =        .631
                ----------
 Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN EX     IN  10
 Outflow HYG file = NONE STORED - BASIN EX     OUT 10

 Pond Node   Data = BASIN EX
 Pond Volume Data = BASIN EX
 Pond Outlet Data = Outlet Existing

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    65.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     61.24 cfs    at   12.2000 hrs
 Peak Outflow      =       .94 cfs    at   24.2000 hrs
 -----------------------------------------------------
 Peak Elevation    =     68.86 ft
 Peak Storage =          8.182 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       9.089
- Infiltration =        .000
- HYG Vol OUT  =       8.458
- Retained Vol =        .631
                 ----------
 Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN EX     IN  100
 Outflow HYG file = NONE STORED - BASIN EX     OUT 100

 Pond Node   Data = BASIN EX
 Pond Volume Data = BASIN EX
 Pond Outlet Data = Outlet Existing

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    65.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    129.73 cfs    at   12.2000 hrs
 Peak Outflow      =     15.80 cfs    at   14.2000 hrs
 -----------------------------------------------------
 Peak Elevation    =     69.95 ft
 Peak Storage =         10.697 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      17.698
- Infiltration =        .000
- HYG Vol OUT  =      17.067
- Retained Vol =        .631
                ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 1 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 2

Pond Node Data = BASIN PROP 1
Pond Volume Data = BASIN PROP 1
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 70.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
70.00	.00	.000	12246	.00	.00	.00
70.10	.00	.030	13893	.00	.00	7.26
70.20	.00	.064	15643	.00	.00	15.46
70.30	.00	.102	17498	.00	.00	24.66
70.40	.00	.144	19456	.00	.00	34.92
70.50	.00	.191	21518	.00	.00	46.29
70.60	.00	.243	23684	.00	.00	58.84
70.70	.00	.300	25954	.00	.00	72.63
70.80	.00	.362	28327	.00	.00	87.70
70.90	.00	.430	30805	.00	.00	104.12
71.00	.00	.504	33386	.00	.00	121.95
71.10	.00	.581	34175	.00	.00	140.71
71.20	.00	.661	34973	.00	.00	159.92
71.30	.00	.742	35780	.00	.00	179.58
71.40	.00	.825	36596	.00	.00	199.68
71.50	.00	.910	37422	.00	.00	220.24
71.60	.00	.997	38257	.00	.00	241.26
71.70	.00	1.086	39101	.00	.00	262.75
71.75	.00	1.131	39526	.00	.00	273.67
71.80	.08	1.176	39954	.00	.08	284.79

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 1 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 2

Pond Node Data = BASIN PROP 1
Pond Volume Data = BASIN PROP 1
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 70.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
71.90	.40	1.269	40816	.00	.40	307.55
72.00	.87	1.364	41688	.00	.87	330.93
72.10	1.44	1.460	41942	.00	1.44	354.73
72.20	2.11	1.556	42197	.00	2.11	378.77
72.30	2.85	1.654	42452	.00	2.85	403.02
72.40	3.66	1.751	42708	.00	3.66	427.49
72.50	4.53	1.850	42965	.00	4.53	452.16
72.60	5.47	1.949	43223	.00	5.47	477.04
72.70	6.46	2.048	43482	.00	6.46	502.11
72.80	7.51	2.148	43741	.00	7.51	527.39
72.90	8.60	2.249	44001	.00	8.60	552.86
73.00	9.75	2.350	44262	.00	9.75	578.52
73.10	12.11	2.453	44782	.00	12.11	605.62
73.20	15.50	2.556	45305	.00	15.50	634.04
73.30	19.57	2.661	45832	.00	19.57	663.42
73.40	24.18	2.766	46361	.00	24.18	693.64
73.50	29.31	2.873	46893	.00	29.31	724.67
73.60	34.83	2.982	47835	.00	34.83	756.51
73.70	40.74	3.093	48786	.00	40.74	789.26
73.80	46.68	3.206	49747	.00	46.68	822.57

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 1 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 2

Pond Node Data = BASIN PROP 1
Pond Volume Data = BASIN PROP 1
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 70.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
73.90	52.40	3.321	50717	.00	52.40	856.19
74.00	57.88	3.439	51696	.00	57.88	890.12

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 1 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 30	P-1 PERVIOUS		P-1 PERVIOUS	1
ADDLINK 10	P-1 IMPERVIOUS		P-1 IMPERVIOUS	1

INFLOWS TO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-1 PERVIOUS	1	.000	.1000	.00
	P-1 IMPERVIOUS	1	.808	1.1000	21.99

TOTAL FLOW INTO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 1 IN	1	.808	1.1000	21.99

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 1 IN
HYG Tag = 1

Peak Discharge = 21.99 cfs
Time to Peak = 1.1000 hrs
HYG Volume = .808 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.3000	.00	.13	.51	1.13	1.73
.8000	2.53	4.96	13.83	21.99	16.57
1.3000	10.45	6.44	4.64	3.56	3.03
1.8000	2.55	1.59	1.18	.60	.23
2.3000	.09	.02	.01	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 1 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 30	P-1 PERVIOUS		P-1 PERVIOUS	2
ADDLINK 10	P-1 IMPERVIOUS		P-1 IMPERVIOUS	2

INFLOWS TO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-1 PERVIOUS	2	.001	20.3000	.00
	P-1 IMPERVIOUS	2	2.385	12.1000	22.49

TOTAL FLOW INTO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 1 IN	2	2.385	12.1000	22.49

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 1 IN
HYG Tag = 2

Peak Discharge = 22.49 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 2.385 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
1.3000	.00	.01	.01	.02	.03
1.8000	.04	.05	.05	.06	.07
2.3000	.08	.09	.09	.10	.11
2.8000	.12	.13	.13	.14	.15
3.3000	.16	.17	.17	.18	.19
3.8000	.20	.21	.21	.22	.23
4.3000	.24	.24	.25	.26	.27
4.8000	.27	.28	.29	.30	.30
5.3000	.31	.32	.32	.33	.34
5.8000	.34	.35	.36	.37	.38
6.3000	.39	.41	.42	.44	.45
6.8000	.47	.49	.50	.52	.53
7.3000	.55	.57	.58	.60	.62
7.8000	.63	.65	.67	.69	.72
8.3000	.75	.78	.82	.85	.89
8.8000	.92	.96	1.00	1.03	1.07
9.3000	1.11	1.14	1.18	1.22	1.25
9.8000	1.29	1.33	1.37	1.41	1.47
10.3000	1.54	1.61	1.69	1.76	1.84
10.8000	1.91	1.99	2.06	2.19	2.39
11.3000	2.63	2.90	3.19	4.00	5.75
11.8000	8.05	10.64	17.77	22.49	18.88
12.3000	14.41	10.83	7.69	5.37	4.09
12.8000	3.41	2.99	2.66	2.41	2.26
13.3000	2.15	2.07	1.99	1.91	1.84
13.8000	1.76	1.69	1.62	1.55	1.50
14.3000	1.46	1.42	1.39	1.35	1.31
14.8000	1.28	1.24	1.21	1.17	1.14
15.3000	1.10	1.07	1.03	1.00	.96
15.8000	.92	.89	.85	.82	.80
16.3000	.78	.76	.75	.73	.72

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.8000	.70	.69	.67	.66	.64
17.3000	.62	.61	.59	.58	.56
17.8000	.55	.53	.52	.50	.49
18.3000	.49	.48	.48	.47	.47
18.8000	.46	.46	.45	.45	.45
19.3000	.44	.44	.43	.43	.42
19.8000	.42	.41	.41	.40	.40
20.3000	.40	.39	.39	.39	.38
20.8000	.38	.38	.37	.37	.37
21.3000	.36	.36	.36	.35	.35
21.8000	.35	.34	.34	.34	.33
22.3000	.33	.33	.32	.32	.32
22.8000	.31	.31	.31	.30	.30
23.3000	.29	.29	.29	.28	.28
23.8000	.28	.27	.27	.15	.06
24.3000	.02	.01	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 1 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 30	P-1 PERVIOUS		P-1 PERVIOUS	10
ADDLINK 10	P-1 IMPERVIOUS		P-1 IMPERVIOUS	10

INFLOWS TO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-1 PERVIOUS	10	.066	12.5000	.14
	P-1 IMPERVIOUS	10	3.699	12.1000	34.29

TOTAL FLOW INTO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 1 IN	10	3.765	12.1000	34.29

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 1 IN
HYG Tag = 10

Peak Discharge = 34.29 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 3.765 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.8000	.00	.00	.02	.03	.05
1.3000	.07	.09	.10	.12	.13
1.8000	.15	.16	.17	.18	.20
2.3000	.21	.22	.24	.25	.26
2.8000	.27	.29	.30	.31	.32
3.3000	.34	.35	.36	.37	.38
3.8000	.39	.41	.42	.43	.44
4.3000	.45	.46	.47	.48	.49
4.8000	.50	.52	.53	.54	.55
5.3000	.56	.57	.58	.59	.60
5.8000	.60	.61	.62	.64	.65
6.3000	.68	.70	.72	.75	.77
6.8000	.79	.82	.84	.87	.89
7.3000	.92	.94	.97	.99	1.02
7.8000	1.04	1.07	1.09	1.12	1.17
8.3000	1.22	1.27	1.32	1.37	1.43
8.8000	1.48	1.54	1.59	1.65	1.70
9.3000	1.76	1.81	1.87	1.92	1.98
9.8000	2.03	2.09	2.15	2.21	2.31
10.3000	2.41	2.52	2.63	2.74	2.86
10.8000	2.97	3.09	3.20	3.38	3.69
11.3000	4.07	4.48	4.91	6.15	8.83
11.8000	12.35	16.30	27.14	34.29	28.75
12.3000	21.97	16.60	11.83	8.29	6.33
12.8000	5.30	4.66	4.16	3.78	3.54
13.3000	3.38	3.25	3.13	3.02	2.90
13.8000	2.79	2.68	2.56	2.46	2.38
14.3000	2.32	2.26	2.21	2.15	2.10
14.8000	2.04	1.99	1.93	1.88	1.82
15.3000	1.77	1.71	1.65	1.60	1.54
15.8000	1.49	1.43	1.37	1.33	1.29

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.3000	1.26	1.23	1.21	1.18	1.16
16.8000	1.13	1.11	1.08	1.06	1.03
17.3000	1.01	.99	.96	.94	.91
17.8000	.89	.86	.84	.82	.80
18.3000	.79	.79	.78	.77	.76
18.8000	.76	.75	.74	.73	.73
19.3000	.72	.71	.70	.70	.69
19.8000	.68	.67	.67	.66	.65
20.3000	.65	.64	.64	.63	.62
20.8000	.62	.61	.61	.60	.60
21.3000	.59	.59	.58	.58	.57
21.8000	.57	.56	.55	.55	.54
22.3000	.53	.53	.52	.52	.51
22.8000	.51	.50	.50	.49	.49
23.3000	.48	.48	.47	.46	.46
23.8000	.45	.44	.44	.23	.09
24.3000	.04	.01	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 1 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 30	P-1 PERVIOUS		P-1 PERVIOUS	100
ADDLINK 10	P-1 IMPERVIOUS		P-1 IMPERVIOUS	100

INFLOWS TO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-1 PERVIOUS	100	.421	12.1000	3.69
	P-1 IMPERVIOUS	100	6.270	12.1000	57.24

TOTAL FLOW INTO: BASIN PROP 1 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 1 IN	100	6.691	12.1000	60.93

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 1 IN
HYG Tag = 100

Peak Discharge = 60.93 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 6.691 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.5000	.00	.01	.05	.10	.15
1.0000	.19	.23	.26	.30	.33
1.5000	.35	.38	.40	.42	.44
2.0000	.46	.48	.50	.52	.54
2.5000	.56	.58	.60	.62	.64
3.0000	.66	.68	.70	.72	.73
3.5000	.75	.77	.79	.80	.82
4.0000	.84	.85	.87	.89	.90
4.5000	.92	.93	.95	.96	.98
5.0000	.99	1.01	1.02	1.04	1.05
5.5000	1.07	1.08	1.10	1.11	1.13
6.0000	1.14	1.16	1.19	1.23	1.26
6.5000	1.30	1.34	1.38	1.42	1.46
7.0000	1.50	1.54	1.58	1.62	1.66
7.5000	1.71	1.74	1.79	1.82	1.87
8.0000	1.91	1.96	2.03	2.11	2.20
8.5000	2.29	2.38	2.47	2.56	2.65
9.0000	2.74	2.83	2.92	3.01	3.10
9.5000	3.19	3.28	3.37	3.46	3.56
10.0000	3.65	3.76	3.91	4.08	4.26
10.5000	4.45	4.64	4.83	5.01	5.20
11.0000	5.39	5.70	6.21	6.84	7.53
11.5000	8.25	10.33	14.81	20.69	27.44
12.0000	46.98	60.93	51.22	39.26	29.67
12.5000	21.09	14.76	11.35	9.56	8.42
13.0000	7.52	6.84	6.42	6.14	5.90
13.5000	5.69	5.48	5.27	5.07	4.86
14.0000	4.65	4.47	4.33	4.22	4.11
14.5000	4.01	3.91	3.81	3.71	3.61
15.0000	3.51	3.41	3.31	3.21	3.10
15.5000	3.00	2.90	2.80	2.70	2.59

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.0000	2.49	2.40	2.34	2.29	2.24
16.5000	2.19	2.15	2.10	2.06	2.01
17.0000	1.97	1.93	1.88	1.84	1.79
17.5000	1.75	1.70	1.66	1.61	1.57
18.0000	1.52	1.48	1.46	1.44	1.43
18.5000	1.41	1.40	1.38	1.37	1.36
19.0000	1.35	1.33	1.32	1.30	1.29
19.5000	1.28	1.26	1.25	1.24	1.22
20.0000	1.21	1.20	1.19	1.18	1.17
20.5000	1.16	1.15	1.13	1.13	1.11
21.0000	1.11	1.10	1.08	1.07	1.07
21.5000	1.05	1.04	1.03	1.03	1.01
22.0000	1.00	.99	.98	.97	.96
22.5000	.95	.94	.93	.92	.91
23.0000	.90	.89	.88	.87	.86
23.5000	.85	.84	.83	.82	.81
24.0000	.80	.40	.15	.06	.02
24.5000	.01	.00			

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 1 IN  1
Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 1

Pond Node   Data = BASIN PROP 1
Pond Volume Data = BASIN PROP 1
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    70.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     21.99 cfs    at    1.1000 hrs
Peak Outflow      =       .00 cfs    at     .4000 hrs
-----------------------------------------------------
Peak Elevation    =     71.38 ft
Peak Storage =           .808 ac-ft
=====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .808
- Infiltration =        .000
- HYG Vol OUT  =        .000
- Retained Vol =        .808
                ----------
 Unrouted Vol =       -.000 ac-ft  (.019% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 1 IN  2
Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 2

Pond Node   Data = BASIN PROP 1
Pond Volume Data = BASIN PROP 1
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    70.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     22.49 cfs    at   12.1000 hrs
Peak Outflow      =      2.42 cfs    at   13.1000 hrs
-----------------------------------------------------
Peak Elevation    =     72.24 ft
Peak Storage =          1.597 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       2.385
- Infiltration =        .000
- HYG Vol OUT  =       1.253
- Retained Vol =       1.133
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 1 IN  10
 Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 10

 Pond Node   Data = BASIN PROP 1
 Pond Volume Data = BASIN PROP 1
 Pond Outlet Data = Outlet 1

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    70.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     34.29 cfs    at   12.1000 hrs
 Peak Outflow      =      8.23 cfs    at   12.6000 hrs
 -----------------------------------------------------
 Peak Elevation    =     72.87 ft
 Peak Storage =          2.215 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       3.765
- Infiltration =        .000
- HYG Vol OUT  =       2.632
- Retained Vol =       1.133
                ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 1 IN  100
 Outflow HYG file = NONE STORED - BASIN PROP 1 OUT 100

 Pond Node   Data = BASIN PROP 1
 Pond Volume Data = BASIN PROP 1
 Pond Outlet Data = Outlet 1

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    70.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     60.93 cfs    at   12.1000 hrs
 Peak Outflow      =     34.26 cfs    at   12.4000 hrs
 -----------------------------------------------------
 Peak Elevation    =     73.59 ft
 Peak Storage =          2.971 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       6.691
- Infiltration =        .000
- HYG Vol OUT  =       5.558
- Retained Vol =       1.133
                 ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING DATA

HYG Dir   = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 2 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 2

Pond Node   Data = BASIN PROP 2
Pond Volume Data = BASIN PROP 2
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   67.00 ft
Starting Volume   =   .000 ac-ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
67.00	.00	.000	4370	.00	.00	.00
67.10	.00	.010	4496	.00	.00	2.46
67.20	.00	.021	4623	.00	.00	5.00
67.30	.00	.031	4753	.00	.00	7.60
67.40	.00	.042	4884	.00	.00	10.28
67.48	.00	.052	4990	.00	.00	12.47
67.50	.00	.054	5017	.00	.00	13.03
67.60	.00	.066	5152	.00	.00	15.85
67.70	.00	.077	5288	.00	.00	18.75
67.80	.00	.090	5427	.00	.00	21.73
67.90	.00	.102	5567	.00	.00	24.78
68.00	.00	.115	5709	.00	.00	27.91
68.10	.00	.129	5852	.00	.00	31.13
68.20	.00	.142	5998	.00	.00	34.42
68.30	.00	.156	6145	.00	.00	37.79
68.40	.00	.170	6294	.00	.00	41.25
68.50	.00	.185	6445	.00	.00	44.78
68.60	.00	.200	6598	.00	.00	48.41
68.70	.00	.215	6752	.00	.00	52.11
68.80	.00	.231	6908	.00	.00	55.91

LEVEL POOL ROUTING DATA

HYG Dir   = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 2 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 2

Pond Node   Data = BASIN PROP 2
Pond Volume Data = BASIN PROP 2
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   67.00 ft
Starting Volume   =   .000 ac-ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
68.90	.00	.247	7066	.00	.00	59.79
69.00	.00	.263	7226	.00	.00	63.76
69.10	.78	.280	7388	.00	.78	68.60
69.20	2.22	.297	7551	.00	2.22	74.19
69.30	2.04	.315	7716	.00	2.04	78.25
69.40	6.26	.333	7883	.00	6.26	86.80
69.50	4.38	.351	8052	.00	4.38	89.35
69.60	10.82	.370	8222	.00	10.82	100.31
69.70	13.29	.389	8395	.00	13.29	107.40
69.80	15.90	.408	8569	.00	15.90	114.72
69.90	18.38	.428	8745	.00	18.38	122.01
70.00	20.82	.448	8922	.00	20.82	129.35
70.10	23.28	.469	9102	.00	23.28	136.82
70.20	25.80	.490	9283	.00	25.80	144.45
70.30	28.39	.512	9466	.00	28.39	152.24
70.40	31.02	.534	9651	.00	31.02	160.18
70.50	33.66	.556	9837	.00	33.66	168.24
70.60	36.33	.579	10025	.00	36.33	176.43
70.70	39.07	.602	10216	.00	39.07	184.79
70.80	41.85	.626	10408	.00	41.85	193.29

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 2 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 2

Pond Node Data = BASIN PROP 2
Pond Volume Data = BASIN PROP 2
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 67.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
70.90	44.61	.650	10601	.00	44.61	201.89
71.00	47.41	.674	10797	.00	47.41	210.64
71.10	50.19	.700	10994	.00	50.19	219.47
71.20	52.97	.725	11193	.00	52.97	228.41
71.30	55.74	.751	11394	.00	55.74	237.46
71.40	58.44	.777	11597	.00	58.44	246.54
71.50	61.07	.804	11801	.00	61.07	255.67
71.60	64.38	.831	12007	.00	64.38	265.60
71.70	67.60	.859	12215	.00	67.60	275.54
71.80	70.76	.888	12425	.00	70.76	285.55
71.90	73.95	.916	12637	.00	73.95	295.70
72.00	76.83	.946	12850	.00	76.83	305.66

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 2 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 40	P-2 PERVIOUS		P-2 PERVIOUS	1
ADDLINK 20	P-2 IMPERVIOUS		P-2 IMPERVIOUS	1

INFLOWS TO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-2 PERVIOUS	1	.000	.1000	.00
	P-2 IMPERVIOUS	1	.391	1.1000	10.64

TOTAL FLOW INTO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 2 IN	1	.391	1.1000	10.64

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 2 IN
HYG Tag = 1

Peak Discharge = 10.64 cfs
Time to Peak = 1.1000 hrs
HYG Volume = .391 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.3000	.00	.06	.25	.55	.84
.8000	1.22	2.40	6.69	10.64	8.02
1.3000	5.06	3.12	2.25	1.72	1.46
1.8000	1.23	.77	.57	.29	.11
2.3000	.04	.01	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 2 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 40	P-2 PERVIOUS		P-2 PERVIOUS	2
ADDLINK 20	P-2 IMPERVIOUS		P-2 IMPERVIOUS	2

INFLOWS TO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-2 PERVIOUS	2	.000	20.9000	.00
	P-2 IMPERVIOUS	2	1.154	12.1000	10.88

TOTAL FLOW INTO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 2 IN	2	1.154	12.1000	10.88

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 2 IN
HYG Tag = 2

Peak Discharge = 10.88 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 1.154 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
1.3000	.00	.00	.01	.01	.01
1.8000	.02	.02	.03	.03	.03
2.3000	.04	.04	.05	.05	.05
2.8000	.06	.06	.06	.07	.07
3.3000	.08	.08	.08	.09	.09
3.8000	.10	.10	.10	.11	.11
4.3000	.11	.12	.12	.12	.13
4.8000	.13	.14	.14	.14	.15
5.3000	.15	.15	.16	.16	.16
5.8000	.17	.17	.17	.18	.18
6.3000	.19	.20	.20	.21	.22
6.8000	.23	.24	.24	.25	.26
7.3000	.27	.27	.28	.29	.30
7.8000	.31	.32	.32	.33	.35
8.3000	.36	.38	.40	.41	.43
8.8000	.45	.46	.48	.50	.52
9.3000	.54	.55	.57	.59	.61
9.8000	.63	.64	.66	.68	.71
10.3000	.75	.78	.82	.85	.89
10.8000	.93	.96	1.00	1.06	1.15
11.3000	1.27	1.40	1.54	1.93	2.78
11.8000	3.90	5.15	8.60	10.88	9.13
12.3000	6.97	5.24	3.72	2.60	1.98
12.8000	1.65	1.45	1.29	1.17	1.09
13.3000	1.04	1.00	.96	.93	.89
13.8000	.85	.82	.78	.75	.73
14.3000	.71	.69	.67	.65	.64
14.8000	.62	.60	.58	.57	.55
15.3000	.53	.52	.50	.48	.46
15.8000	.45	.43	.41	.40	.39
16.3000	.38	.37	.36	.35	.35

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.8000	.34	.33	.32	.32	.31
17.3000	.30	.29	.29	.28	.27
17.8000	.26	.26	.25	.24	.24
18.3000	.24	.23	.23	.23	.23
18.8000	.22	.22	.22	.22	.22
19.3000	.21	.21	.21	.21	.20
19.8000	.20	.20	.20	.20	.19
20.3000	.19	.19	.19	.19	.18
20.8000	.18	.18	.18	.18	.18
21.3000	.18	.17	.17	.17	.17
21.8000	.17	.17	.16	.16	.16
22.3000	.16	.16	.16	.16	.15
22.8000	.15	.15	.15	.15	.14
23.3000	.14	.14	.14	.14	.14
23.8000	.13	.13	.13	.07	.03
24.3000	.01	.00	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 2 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 40	P-2 PERVIOUS		P-2 PERVIOUS	10
ADDLINK 20	P-2 IMPERVIOUS		P-2 IMPERVIOUS	10

INFLOWS TO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-2 PERVIOUS	10	.045	12.5000	.10
	P-2 IMPERVIOUS	10	1.790	12.1000	16.59

TOTAL FLOW INTO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 2 IN	10	1.835	12.1000	16.59

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 2 IN
HYG Tag = 10

Peak Discharge = 16.59 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 1.835 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.8000	.00	.00	.01	.02	.02
1.3000	.03	.04	.05	.06	.06
1.8000	.07	.08	.08	.09	.10
2.3000	.10	.11	.11	.12	.13
2.8000	.13	.14	.14	.15	.16
3.3000	.16	.17	.17	.18	.19
3.8000	.19	.20	.20	.21	.21
4.3000	.22	.22	.23	.23	.24
4.8000	.24	.25	.25	.26	.26
5.3000	.27	.27	.28	.28	.29
5.8000	.29	.30	.30	.31	.32
6.3000	.33	.34	.35	.36	.37
6.8000	.38	.40	.41	.42	.43
7.3000	.44	.46	.47	.48	.49
7.8000	.50	.52	.53	.54	.56
8.3000	.59	.61	.64	.67	.69
8.8000	.72	.74	.77	.80	.82
9.3000	.85	.88	.90	.93	.96
9.8000	.98	1.01	1.04	1.07	1.12
10.3000	1.17	1.22	1.27	1.33	1.38
10.8000	1.44	1.49	1.55	1.64	1.79
11.3000	1.97	2.17	2.38	2.98	4.27
11.8000	5.98	7.89	13.13	16.59	13.91
12.3000	10.64	8.06	5.75	4.03	3.09
12.8000	2.59	2.28	2.04	1.85	1.74
13.3000	1.66	1.60	1.54	1.48	1.43
13.8000	1.37	1.32	1.26	1.21	1.18
14.3000	1.14	1.12	1.09	1.06	1.04
14.8000	1.01	.98	.96	.93	.90
15.3000	.87	.85	.82	.79	.76
15.8000	.74	.71	.68	.66	.64

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.3000	.62	.61	.60	.59	.58
16.8000	.56	.55	.54	.53	.51
17.3000	.50	.49	.48	.47	.45
17.8000	.44	.43	.42	.41	.40
18.3000	.39	.39	.39	.38	.38
18.8000	.38	.37	.37	.37	.36
19.3000	.36	.35	.35	.35	.34
19.8000	.34	.34	.33	.33	.33
20.3000	.32	.32	.32	.32	.31
20.8000	.31	.31	.30	.30	.30
21.3000	.30	.29	.29	.29	.28
21.8000	.28	.28	.28	.27	.27
22.3000	.27	.27	.26	.26	.26
22.8000	.25	.25	.25	.24	.24
23.3000	.24	.24	.23	.23	.23
23.8000	.23	.22	.22	.11	.04
24.3000	.02	.01	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 2 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 40	P-2 PERVIOUS		P-2 PERVIOUS	100
ADDLINK 20	P-2 IMPERVIOUS		P-2 IMPERVIOUS	100

INFLOWS TO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-2 PERVIOUS	100	.291	12.1000	2.56
	P-2 IMPERVIOUS	100	3.034	12.1000	27.70

TOTAL FLOW INTO: BASIN PROP 2 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 2 IN	100	3.325	12.1000	30.25

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 2 IN
HYG Tag = 100

Peak Discharge = 30.25 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 3.325 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.5000	.00	.01	.03	.05	.07
1.0000	.09	.11	.13	.14	.16
1.5000	.17	.18	.19	.20	.21
2.0000	.22	.23	.24	.25	.26
2.5000	.27	.28	.29	.30	.31
3.0000	.32	.33	.34	.35	.35
3.5000	.36	.37	.38	.39	.40
4.0000	.40	.41	.42	.43	.44
4.5000	.44	.45	.46	.47	.47
5.0000	.48	.49	.50	.50	.51
5.5000	.52	.52	.53	.54	.55
6.0000	.55	.56	.58	.59	.61
6.5000	.63	.65	.67	.69	.71
7.0000	.73	.75	.77	.79	.80
7.5000	.83	.84	.86	.88	.90
8.0000	.92	.95	.98	1.02	1.06
8.5000	1.11	1.15	1.19	1.24	1.28
9.0000	1.32	1.37	1.41	1.46	1.50
9.5000	1.54	1.59	1.63	1.68	1.72
10.0000	1.76	1.82	1.89	1.98	2.06
10.5000	2.15	2.24	2.34	2.43	2.52
11.0000	2.61	2.76	3.00	3.31	3.64
11.5000	3.99	5.00	7.17	10.01	13.32
12.0000	23.07	30.25	25.46	19.56	14.82
12.5000	10.54	7.38	5.70	4.82	4.26
13.0000	3.81	3.46	3.26	3.11	3.00
13.5000	2.89	2.79	2.68	2.58	2.47
14.0000	2.37	2.28	2.21	2.15	2.10
14.5000	2.05	2.00	1.95	1.90	1.84
15.0000	1.79	1.74	1.69	1.64	1.59
15.5000	1.54	1.48	1.43	1.38	1.33

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.0000	1.28	1.23	1.20	1.17	1.15
16.5000	1.12	1.10	1.08	1.06	1.03
17.0000	1.01	.99	.96	.94	.92
17.5000	.90	.87	.85	.83	.80
18.0000	.78	.76	.75	.74	.73
18.5000	.73	.72	.71	.71	.70
19.0000	.69	.68	.68	.67	.66
19.5000	.66	.65	.64	.64	.63
20.0000	.62	.62	.61	.61	.60
20.5000	.60	.59	.58	.58	.57
21.0000	.57	.56	.56	.55	.55
21.5000	.54	.54	.53	.53	.52
22.0000	.52	.51	.51	.50	.50
22.5000	.49	.49	.48	.48	.47
23.0000	.47	.46	.45	.45	.44
23.5000	.44	.43	.43	.42	.42
24.0000	.41	.20	.08	.03	.01
24.5000	.00	.00			

```
                   LEVEL POOL ROUTING SUMMARY

  HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
  Inflow  HYG file = NONE STORED - BASIN PROP 2 IN  1
  Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 1

  Pond Node   Data = BASIN PROP 2
  Pond Volume Data = BASIN PROP 2
  Pond Outlet Data = Outlet 2

  No Infiltration

  INITIAL CONDITIONS
  ----------------------------------
  Starting WS Elev   =    67.00 ft
  Starting Volume    =     .000 ac-ft
  Starting Outflow   =      .00 cfs
  Starting Infiltr.  =      .00 cfs
  Starting Total Qout=      .00 cfs
  Time Increment     =    .1000 hrs


  INFLOW/OUTFLOW HYDROGRAPH SUMMARY
  =====================================================
  Peak Inflow       =     10.64 cfs    at    1.1000 hrs
  Peak Outflow      =      2.20 cfs    at    1.6000 hrs
  -----------------------------------------------------
  Peak Elevation    =     69.22 ft
  Peak Storage =            .300 ac-ft
  =====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .391
- Infiltration =        .000
- HYG Vol OUT  =        .128
- Retained Vol =        .263
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 2 IN  2
 Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 2

 Pond Node   Data = BASIN PROP 2
 Pond Volume Data = BASIN PROP 2
 Pond Outlet Data = Outlet 2

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    67.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     10.88 cfs    at   12.1000 hrs
 Peak Outflow      =     10.25 cfs    at   12.2000 hrs
 -----------------------------------------------------
 Peak Elevation    =     69.59 ft
 Peak Storage =           .368 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.154
- Infiltration =        .000
- HYG Vol OUT  =        .891
- Retained Vol =        .263
                 ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 2 IN  10
Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 10

Pond Node   Data = BASIN PROP 2
Pond Volume Data = BASIN PROP 2
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    67.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     16.59 cfs    at   12.1000 hrs
Peak Outflow      =     14.82 cfs    at   12.2000 hrs
-----------------------------------------------------
Peak Elevation    =     69.76 ft
Peak Storage =           .400 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.835
- Infiltration =        .000
- HYG Vol OUT  =       1.572
- Retained Vol =        .263
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 2 IN  100
 Outflow HYG file = NONE STORED - BASIN PROP 2 OUT 100

 Pond Node   Data = BASIN PROP 2
 Pond Volume Data = BASIN PROP 2
 Pond Outlet Data = Outlet 2

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    67.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     30.25 cfs    at   12.1000 hrs
 Peak Outflow      =     26.29 cfs    at   12.2000 hrs
 -----------------------------------------------------
 Peak Elevation    =     70.22 ft
 Peak Storage =           .494 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       3.325
- Infiltration =        .000
- HYG Vol OUT  =       3.062
- Retained Vol =        .263
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 3 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 2

Pond Node Data = BASIN PROP 3
Pond Volume Data = BASIN PROP 3
Pond Outlet Data = Outlet 3

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 67.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
67.00	.00	.000	2290	.00	.00	.00
67.10	.00	.005	2362	.00	.00	1.29
67.20	.00	.011	2436	.00	.00	2.63
67.30	.00	.017	2510	.00	.00	4.00
67.40	.00	.022	2586	.00	.00	5.41
67.50	.00	.028	2663	.00	.00	6.87
67.60	.00	.035	2741	.00	.00	8.37
67.70	.00	.041	2820	.00	.00	9.92
67.80	.00	.048	2900	.00	.00	11.51
67.90	.00	.054	2982	.00	.00	13.14
68.00	.00	.061	3064	.00	.00	14.82
68.10	.00	.068	3148	.00	.00	16.55
68.20	.00	.076	3232	.00	.00	18.32
68.30	.00	.083	3318	.00	.00	20.14
68.40	.00	.091	3405	.00	.00	22.01
68.50	.00	.099	3493	.00	.00	23.92
68.60	.00	.107	3583	.00	.00	25.89
68.70	.00	.115	3673	.00	.00	27.90
68.80	.00	.124	3764	.00	.00	29.97
68.90	.00	.133	3857	.00	.00	32.09

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 3 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 2

Pond Node Data = BASIN PROP 3
Pond Volume Data = BASIN PROP 3
Pond Outlet Data = Outlet 3

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 67.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
69.00	.00	.142	3951	.00	.00	34.25
69.10	.39	.151	4046	.00	.39	36.87
69.20	1.11	.160	4142	.00	1.11	39.86
69.30	2.04	.170	4239	.00	2.04	43.11
69.40	3.14	.180	4337	.00	3.14	46.60
69.50	4.38	.190	4436	.00	4.38	50.28
69.60	5.76	.200	4537	.00	5.76	54.15
69.70	7.26	.210	4638	.00	7.26	58.20
69.80	8.88	.221	4741	.00	8.88	62.42
69.90	10.59	.232	4845	.00	10.59	66.80
70.00	12.39	.243	4950	.00	12.39	71.31
70.10	14.31	.255	4950	.00	14.31	75.98
70.20	16.31	.266	4950	.00	16.31	80.73
70.30	18.37	.278	4950	.00	18.37	85.55
70.40	20.37	.289	4950	.00	20.37	90.30
70.50	22.22	.300	4950	.00	22.22	94.90
70.60	24.89	.312	4950	.00	24.89	100.31
70.70	28.05	.323	4950	.00	28.05	106.23
70.80	31.17	.334	4950	.00	31.17	112.09
70.90	33.75	.346	4950	.00	33.75	117.42

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 3 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 2

Pond Node Data = BASIN PROP 3
Pond Volume Data = BASIN PROP 3
Pond Outlet Data = Outlet 3

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 67.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
71.00	35.83	.357	4950	.00	35.83	122.26
71.10	37.65	.368	4950	.00	37.65	126.82
71.20	39.20	.380	4950	.00	39.20	131.13
71.30	40.46	.391	4950	.00	40.46	135.14
71.40	41.47	.403	4950	.00	41.47	138.89
71.50	42.30	.414	4950	.00	42.30	142.47
71.60	42.95	.425	4950	.00	42.95	145.88
71.70	43.59	.437	4950	.00	43.59	149.27
71.80	44.23	.448	4950	.00	44.23	152.66
71.90	44.86	.459	4950	.00	44.86	156.04
72.00	45.49	.471	4950	.00	45.49	159.42

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 3 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 60	P-3 PERVIOUS		P-3 PERVIOUS	1
ADDLINK 50	P-3 IMPERVIOUS		P-3 IMPERVIOUS	1

INFLOWS TO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-3 PERVIOUS	1	.000	.1000	.00
	P-3 IMPERVIOUS	1	.182	1.1000	4.97

TOTAL FLOW INTO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 3 IN	1	.182	1.1000	4.97

```
TOTAL NODE INFLOW...
HYG file =
HYG ID   = BASIN PROP 3 IN
HYG Tag  =      1
-----------------------------------
Peak Discharge =         4.97 cfs
Time to Peak   =       1.1000 hrs
HYG Volume     =         .182 ac-ft
-----------------------------------
```

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
.3000	.00	.03	.12	.26	.39
.8000	.57	1.12	3.12	4.97	3.74
1.3000	2.36	1.45	1.05	.80	.68
1.8000	.58	.36	.27	.13	.05
2.3000	.02	.01	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 3 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 60	P-3 PERVIOUS		P-3 PERVIOUS	2
ADDLINK 50	P-3 IMPERVIOUS		P-3 IMPERVIOUS	2

INFLOWS TO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-3 PERVIOUS	2	.000	.1000	.00
	P-3 IMPERVIOUS	2	.538	12.1000	5.08

TOTAL FLOW INTO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 3 IN	2	.538	12.1000	5.08

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 3 IN
HYG Tag = 2

Peak Discharge = 5.08 cfs
Time to Peak = 12.1000 hrs
HYG Volume = .538 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
1.3000	.00	.00	.00	.00	.01
1.8000	.01	.01	.01	.01	.02
2.3000	.02	.02	.02	.02	.02
2.8000	.03	.03	.03	.03	.03
3.3000	.04	.04	.04	.04	.04
3.8000	.04	.05	.05	.05	.05
4.3000	.05	.05	.06	.06	.06
4.8000	.06	.06	.06	.07	.07
5.3000	.07	.07	.07	.07	.08
5.8000	.08	.08	.08	.08	.09
6.3000	.09	.09	.10	.10	.10
6.8000	.11	.11	.11	.12	.12
7.3000	.12	.13	.13	.14	.14
7.8000	.14	.15	.15	.16	.16
8.3000	.17	.18	.18	.19	.20
8.8000	.21	.22	.23	.23	.24
9.3000	.25	.26	.27	.27	.28
9.8000	.29	.30	.31	.32	.33
10.3000	.35	.36	.38	.40	.41
10.8000	.43	.45	.47	.49	.54
11.3000	.59	.66	.72	.90	1.30
11.8000	1.82	2.40	4.01	5.08	4.26
12.3000	3.25	2.44	1.74	1.21	.92
12.8000	.77	.67	.60	.55	.51
13.3000	.49	.47	.45	.43	.42
13.8000	.40	.38	.37	.35	.34
14.3000	.33	.32	.31	.30	.30
14.8000	.29	.28	.27	.26	.26
15.3000	.25	.24	.23	.22	.22
15.8000	.21	.20	.19	.19	.18
16.3000	.18	.17	.17	.17	.16

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.8000	.16	.16	.15	.15	.14
17.3000	.14	.14	.13	.13	.13
17.8000	.12	.12	.12	.11	.11
18.3000	.11	.11	.11	.11	.11
18.8000	.10	.10	.10	.10	.10
19.3000	.10	.10	.10	.10	.10
19.8000	.09	.09	.09	.09	.09
20.3000	.09	.09	.09	.09	.09
20.8000	.09	.08	.08	.08	.08
21.3000	.08	.08	.08	.08	.08
21.8000	.08	.08	.08	.08	.07
22.3000	.07	.07	.07	.07	.07
22.8000	.07	.07	.07	.07	.07
23.3000	.07	.07	.06	.06	.06
23.8000	.06	.06	.06	.03	.01
24.3000	.01	.00	.00		

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 3 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 60	P-3 PERVIOUS		P-3 PERVIOUS	10
ADDLINK 50	P-3 IMPERVIOUS		P-3 IMPERVIOUS	10

INFLOWS TO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-3 PERVIOUS	10	.025	12.5000	.05
	P-3 IMPERVIOUS	10	.835	12.1000	7.74

TOTAL FLOW INTO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 3 IN	10	.861	12.1000	7.74

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 3 IN
HYG Tag = 10

Peak Discharge = 7.74 cfs
Time to Peak = 12.1000 hrs
HYG Volume = .861 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.9000	.00	.00	.01	.01	.02
1.4000	.02	.02	.03	.03	.03
1.9000	.04	.04	.04	.04	.05
2.4000	.05	.05	.06	.06	.06
2.9000	.06	.07	.07	.07	.08
3.4000	.08	.08	.08	.09	.09
3.9000	.09	.09	.10	.10	.10
4.4000	.10	.11	.11	.11	.11
4.9000	.12	.12	.12	.12	.13
5.4000	.13	.13	.13	.13	.14
5.9000	.14	.14	.14	.15	.15
6.4000	.16	.16	.17	.17	.18
6.9000	.19	.19	.20	.20	.21
7.4000	.21	.22	.22	.23	.24
7.9000	.24	.25	.25	.26	.27
8.4000	.29	.30	.31	.32	.33
8.9000	.35	.36	.37	.38	.40
9.4000	.41	.42	.43	.45	.46
9.9000	.47	.48	.50	.52	.54
10.4000	.57	.59	.62	.65	.67
10.9000	.70	.72	.76	.83	.92
11.4000	1.01	1.11	1.39	1.99	2.79
11.9000	3.68	6.13	7.74	6.49	4.97
12.4000	3.77	2.69	1.89	1.45	1.22
12.9000	1.07	.96	.87	.82	.78
13.4000	.75	.73	.70	.67	.65
13.9000	.62	.60	.57	.56	.54
14.4000	.53	.51	.50	.49	.48
14.9000	.46	.45	.44	.43	.41
15.4000	.40	.39	.37	.36	.35
15.9000	.34	.32	.31	.30	.30

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.4000	.29	.28	.28	.27	.27
16.9000	.26	.26	.25	.24	.24
17.4000	.23	.23	.22	.22	.21
17.9000	.20	.20	.19	.19	.19
18.4000	.19	.18	.18	.18	.18
18.9000	.18	.18	.17	.17	.17
19.4000	.17	.17	.17	.16	.16
19.9000	.16	.16	.16	.16	.15
20.4000	.15	.15	.15	.15	.15
20.9000	.15	.14	.14	.14	.14
21.4000	.14	.14	.14	.14	.13
21.9000	.13	.13	.13	.13	.13
22.4000	.13	.12	.12	.12	.12
22.9000	.12	.12	.12	.12	.11
23.4000	.11	.11	.11	.11	.11
23.9000	.11	.10	.05	.02	.01
24.4000	.00	.00			

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 3 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 60	P-3 PERVIOUS		P-3 PERVIOUS	100
ADDLINK 50	P-3 IMPERVIOUS		P-3 IMPERVIOUS	100

INFLOWS TO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-3 PERVIOUS	100	.162	12.1000	1.42
	P-3 IMPERVIOUS	100	1.416	12.1000	12.92

TOTAL FLOW INTO: BASIN PROP 3 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 3 IN	100	1.578	12.1000	14.35

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 3 IN
HYG Tag = 100

Peak Discharge = 14.35 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 1.578 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.5000	.00	.00	.01	.02	.03
1.0000	.04	.05	.06	.07	.07
1.5000	.08	.09	.09	.10	.10
2.0000	.10	.11	.11	.12	.12
2.5000	.13	.13	.14	.14	.14
3.0000	.15	.15	.16	.16	.17
3.5000	.17	.17	.18	.18	.19
4.0000	.19	.19	.20	.20	.20
4.5000	.21	.21	.21	.22	.22
5.0000	.22	.23	.23	.23	.24
5.5000	.24	.24	.25	.25	.25
6.0000	.26	.26	.27	.28	.29
6.5000	.29	.30	.31	.32	.33
7.0000	.34	.35	.36	.37	.38
7.5000	.39	.39	.40	.41	.42
8.0000	.43	.44	.46	.48	.50
8.5000	.52	.54	.56	.58	.60
9.0000	.62	.64	.66	.68	.70
9.5000	.72	.74	.76	.78	.80
10.0000	.82	.85	.88	.92	.96
10.5000	1.01	1.05	1.09	1.13	1.17
11.0000	1.22	1.29	1.40	1.55	1.70
11.5000	1.86	2.33	3.34	4.67	6.22
12.0000	10.87	14.35	12.08	9.30	7.06
12.5000	5.02	3.52	2.72	2.31	2.04
13.0000	1.82	1.66	1.56	1.50	1.44
13.5000	1.39	1.34	1.29	1.24	1.19
14.0000	1.14	1.10	1.06	1.04	1.01
14.5000	.99	.96	.94	.91	.89
15.0000	.87	.84	.82	.79	.77
15.5000	.74	.72	.69	.67	.64

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.0000	.62	.59	.58	.57	.55
16.5000	.54	.53	.52	.51	.50
17.0000	.49	.48	.47	.46	.44
17.5000	.43	.42	.41	.40	.39
18.0000	.38	.37	.36	.36	.35
18.5000	.35	.35	.34	.34	.34
19.0000	.33	.33	.33	.32	.32
19.5000	.32	.32	.31	.31	.30
20.0000	.30	.30	.30	.29	.29
20.5000	.29	.29	.28	.28	.28
21.0000	.28	.27	.27	.27	.27
21.5000	.26	.26	.26	.26	.25
22.0000	.25	.25	.25	.24	.24
22.5000	.24	.24	.23	.23	.23
23.0000	.23	.22	.22	.22	.22
23.5000	.21	.21	.21	.21	.20
24.0000	.20	.10	.04	.01	.00
24.5000	.00	.00			

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 3 IN  1
 Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 1

 Pond Node   Data = BASIN PROP 3
 Pond Volume Data = BASIN PROP 3
 Pond Outlet Data = Outlet 3

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    67.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =      4.97 cfs    at    1.1000 hrs
 Peak Outflow      =       .71 cfs    at    1.7000 hrs
 -----------------------------------------------------
 Peak Elevation    =     69.14 ft
 Peak Storage =           .155 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .182
- Infiltration =        .000
- HYG Vol OUT  =        .041
- Retained Vol =        .142
                ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 3 IN  2
 Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 2

 Pond Node   Data = BASIN PROP 3
 Pond Volume Data = BASIN PROP 3
 Pond Outlet Data = Outlet 3

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    67.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =      5.08 cfs    at   12.1000 hrs
 Peak Outflow      =      4.40 cfs    at   12.2000 hrs
 -----------------------------------------------------
 Peak Elevation    =     69.50 ft
 Peak Storage =           .190 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .538
- Infiltration =        .000
- HYG Vol OUT  =        .397
- Retained Vol =        .142
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
 Inflow  HYG file = NONE STORED - BASIN PROP 3 IN  10
 Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 10

 Pond Node   Data = BASIN PROP 3
 Pond Volume Data = BASIN PROP 3
 Pond Outlet Data = Outlet 3

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    67.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =      7.74 cfs    at   12.1000 hrs
 Peak Outflow      =      6.87 cfs    at   12.2000 hrs
 -----------------------------------------------------
 Peak Elevation    =     69.67 ft
 Peak Storage =           .208 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .861
- Infiltration =        .000
- HYG Vol OUT  =        .719
- Retained Vol =        .142
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    LEVEL POOL ROUTING SUMMARY

  HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
  Inflow  HYG file = NONE STORED - BASIN PROP 3 IN  100
  Outflow HYG file = NONE STORED - BASIN PROP 3 OUT 100

  Pond Node   Data = BASIN PROP 3
  Pond Volume Data = BASIN PROP 3
  Pond Outlet Data = Outlet 3

  No Infiltration

  INITIAL CONDITIONS
  ----------------------------------
  Starting WS Elev   =    67.00 ft
  Starting Volume    =     .000 ac-ft
  Starting Outflow   =      .00 cfs
  Starting Infiltr.  =      .00 cfs
  Starting Total Qout=      .00 cfs
  Time Increment     =    .1000 hrs


  INFLOW/OUTFLOW HYDROGRAPH SUMMARY
  =====================================================
  Peak Inflow       =     14.35 cfs    at   12.1000 hrs
  Peak Outflow      =     12.88 cfs    at   12.2000 hrs
  -----------------------------------------------------
  Peak Elevation    =     70.03 ft
  Peak Storage =           .246 ac-ft
  =====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.578
- Infiltration =        .000
- HYG Vol OUT  =       1.436
- Retained Vol =        .142
                ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 4 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 2

Pond Node Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 65.25 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
65.25	.00	.000	2641	.00	.00	.00
65.35	.00	.006	2702	.00	.00	1.48
65.45	.00	.012	2764	.00	.00	3.00
65.55	.00	.019	2826	.00	.00	4.55
65.65	.00	.025	2889	.00	.00	6.14
65.75	.00	.032	2953	.00	.00	7.77
65.85	.00	.039	3017	.00	.00	9.42
65.95	.00	.046	3082	.00	.00	11.12
66.05	.00	.053	3148	.00	.00	12.85
66.15	.00	.060	3215	.00	.00	14.62
66.25	.00	.068	3282	.00	.00	16.42
66.35	.00	.075	3350	.00	.00	18.26
66.45	.00	.083	3418	.00	.00	20.14
66.55	.00	.091	3488	.00	.00	22.06
66.65	.00	.099	3558	.00	.00	24.02
66.75	.00	.107	3628	.00	.00	26.01
66.85	.00	.116	3700	.00	.00	28.05
66.95	.00	.124	3772	.00	.00	30.12
67.05	.00	.133	3844	.00	.00	32.24
67.15	.00	.142	3918	.00	.00	34.40

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 4 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 2

Pond Node Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 65.25 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
67.25	.00	.151	3992	.00	.00	36.59
67.35	.39	.160	4067	.00	.39	39.22
67.45	1.11	.170	4143	.00	1.11	42.22
67.55	2.04	.179	4219	.00	2.04	45.47
67.65	3.14	.189	4296	.00	3.14	48.93
67.75	4.38	.199	4373	.00	4.38	52.59
67.85	5.77	.209	4452	.00	5.77	56.42
67.95	7.27	.220	4531	.00	7.27	60.42
68.05	8.88	.230	4610	.00	8.88	64.57
68.15	10.59	.241	4691	.00	10.59	68.87
68.25	12.41	.252	4772	.00	12.41	73.31
68.35	14.32	.263	4854	.00	14.32	77.90
68.45	16.31	.274	4936	.00	16.31	82.61
68.50	17.34	.280	4978	.00	17.34	85.02
68.55	18.80	.285	5019	.00	18.80	87.86
68.65	22.70	.297	5103	.00	22.70	94.58
68.75	27.44	.309	5188	.00	27.44	102.18
68.85	32.81	.321	5273	.00	32.81	110.45
68.95	38.34	.333	5359	.00	38.34	118.94
69.05	42.40	.345	5446	.00	42.40	126.00

LEVEL POOL ROUTING DATA

HYG Dir = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow HYG file = NONE STORED - BASIN PROP 4 IN 2
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 2

Pond Node Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 65.25 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
69.15	45.75	.358	5533	.00	45.75	132.40
69.25	48.57	.371	5621	.00	48.57	138.32
69.35	50.90	.384	5710	.00	50.90	143.80
69.45	52.77	.397	5800	.00	52.77	148.86
69.55	54.20	.410	5890	.00	54.20	153.54
69.65	55.30	.424	5981	.00	55.30	157.93
69.75	56.15	.438	6072	.00	56.15	162.13
69.85	56.82	.452	6164	.00	56.82	166.20
69.95	57.49	.466	6257	.00	57.49	170.32
70.00	57.83	.473	6304	.00	57.83	172.40

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 4 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 100	P-4 IMPERVIOUS		P-4 IMPERVIOUS	1
ADDLINK 110	P-4 PERVIOUS		P-4 PERVIOUS	1

INFLOWS TO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-4 IMPERVIOUS	1	.513	1.1000	13.95
	P-4 PERVIOUS	1	.000	.1000	.00

TOTAL FLOW INTO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 4 IN	1	.513	1.1000	13.95

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 4 IN
HYG Tag = 1

Peak Discharge = 13.95 cfs
Time to Peak = 1.1000 hrs
HYG Volume = .513 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.3000	.00	.08	.33	.72	1.10
.8000	1.60	3.14	8.78	13.95	10.51
1.3000	6.63	4.09	2.94	2.26	1.92
1.8000	1.62	1.01	.75	.38	.15
2.3000	.06	.02	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 4 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 100	P-4 IMPERVIOUS		P-4 IMPERVIOUS	2
ADDLINK 110	P-4 PERVIOUS		P-4 PERVIOUS	2

INFLOWS TO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-4 IMPERVIOUS	2	1.513	12.1000	14.27
	P-4 PERVIOUS	2	.000	21.5000	.00

TOTAL FLOW INTO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 4 IN	2	1.513	12.1000	14.27

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 4 IN
HYG Tag = 2

Peak Discharge = 14.27 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 1.513 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
1.3000	.00	.00	.01	.01	.02
1.8000	.02	.03	.03	.04	.04
2.3000	.05	.05	.06	.06	.07
2.8000	.07	.08	.09	.09	.10
3.3000	.10	.11	.11	.12	.12
3.8000	.13	.13	.13	.14	.14
4.3000	.15	.15	.16	.16	.17
4.8000	.17	.18	.18	.19	.19
5.3000	.20	.20	.21	.21	.21
5.8000	.22	.22	.23	.23	.24
6.3000	.25	.26	.27	.28	.29
6.8000	.30	.31	.32	.33	.34
7.3000	.35	.36	.37	.38	.39
7.8000	.40	.41	.42	.44	.45
8.3000	.48	.50	.52	.54	.56
8.8000	.59	.61	.63	.66	.68
9.3000	.70	.73	.75	.77	.80
9.8000	.82	.84	.87	.90	.93
10.3000	.98	1.02	1.07	1.12	1.17
10.8000	1.21	1.26	1.31	1.39	1.51
11.3000	1.67	1.84	2.02	2.54	3.65
11.8000	5.11	6.75	11.27	14.27	11.98
12.3000	9.14	6.87	4.88	3.41	2.59
12.8000	2.16	1.90	1.69	1.53	1.43
13.3000	1.36	1.31	1.26	1.21	1.17
13.8000	1.12	1.07	1.03	.98	.95
14.3000	.93	.90	.88	.86	.83
14.8000	.81	.79	.77	.74	.72
15.3000	.70	.68	.65	.63	.61
15.8000	.59	.56	.54	.52	.51
16.3000	.50	.48	.47	.46	.46

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.8000	.44	.44	.43	.42	.41
17.3000	.40	.39	.38	.37	.36
17.8000	.35	.34	.33	.32	.31
18.3000	.31	.31	.30	.30	.30
18.8000	.29	.29	.29	.29	.28
19.3000	.28	.28	.27	.27	.27
19.8000	.27	.26	.26	.26	.25
20.3000	.25	.25	.25	.25	.24
20.8000	.24	.24	.24	.23	.23
21.3000	.23	.23	.23	.22	.22
21.8000	.22	.22	.22	.21	.21
22.3000	.21	.21	.20	.20	.20
22.8000	.20	.20	.19	.19	.19
23.3000	.19	.18	.18	.18	.18
23.8000	.18	.17	.17	.09	.04
24.3000	.01	.00	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 4 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 100	P-4 IMPERVIOUS		P-4 IMPERVIOUS	10
ADDLINK 110	P-4 PERVIOUS		P-4 PERVIOUS	10

INFLOWS TO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-4 IMPERVIOUS	10	2.347	12.1000	21.75
	P-4 PERVIOUS	10	.037	12.5000	.08

TOTAL FLOW INTO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 4 IN	10	2.384	12.1000	21.75

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 4 IN
HYG Tag = 10

Peak Discharge = 21.75 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 2.384 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.8000	.00	.00	.01	.02	.03
1.3000	.04	.06	.07	.08	.08
1.8000	.09	.10	.11	.12	.12
2.3000	.13	.14	.15	.16	.17
2.8000	.17	.18	.19	.20	.21
3.3000	.21	.22	.23	.24	.24
3.8000	.25	.26	.26	.27	.28
4.3000	.29	.29	.30	.31	.31
4.8000	.32	.33	.33	.34	.35
5.3000	.35	.36	.37	.37	.38
5.8000	.38	.39	.40	.40	.42
6.3000	.43	.44	.46	.47	.49
6.8000	.50	.52	.54	.55	.57
7.3000	.58	.60	.61	.63	.65
7.8000	.66	.68	.69	.71	.74
8.3000	.77	.80	.84	.87	.91
8.8000	.94	.98	1.01	1.05	1.08
9.3000	1.12	1.15	1.19	1.22	1.26
9.8000	1.29	1.33	1.36	1.41	1.46
10.3000	1.53	1.60	1.67	1.74	1.81
10.8000	1.88	1.96	2.03	2.15	2.34
11.3000	2.58	2.84	3.11	3.90	5.60
11.8000	7.84	10.34	17.22	21.75	18.24
12.3000	13.94	10.52	7.49	5.25	4.01
12.8000	3.35	2.95	2.63	2.39	2.24
13.3000	2.14	2.05	1.98	1.91	1.83
13.8000	1.76	1.69	1.62	1.55	1.51
14.3000	1.46	1.43	1.39	1.36	1.32
14.8000	1.29	1.25	1.22	1.18	1.15
15.3000	1.11	1.08	1.04	1.01	.97
15.8000	.94	.90	.87	.84	.81

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.3000	.79	.78	.76	.74	.73
16.8000	.71	.70	.68	.67	.65
17.3000	.64	.62	.61	.59	.57
17.8000	.56	.54	.53	.51	.51
18.3000	.50	.49	.49	.49	.48
18.8000	.48	.47	.47	.46	.46
19.3000	.45	.45	.44	.44	.43
19.8000	.43	.42	.42	.41	.41
20.3000	.41	.40	.40	.40	.39
20.8000	.39	.39	.38	.38	.38
21.3000	.37	.37	.36	.36	.36
21.8000	.36	.35	.35	.34	.34
22.3000	.34	.33	.33	.33	.32
22.8000	.32	.32	.31	.31	.31
23.3000	.30	.30	.30	.29	.29
23.8000	.28	.28	.28	.15	.06
24.3000	.02	.01	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: BASIN PROP 4 IN

HYG Directory: P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Reports\S

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 100	P-4 IMPERVIOUS		P-4 IMPERVIOUS	100
ADDLINK 110	P-4 PERVIOUS		P-4 PERVIOUS	100

INFLOWS TO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	P-4 IMPERVIOUS	100	3.978	12.1000	36.31
	P-4 PERVIOUS	100	.237	12.1000	2.08

TOTAL FLOW INTO: BASIN PROP 4 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	BASIN PROP 4 IN	100	4.215	12.1000	38.40

TOTAL NODE INFLOW...
HYG file =
HYG ID = BASIN PROP 4 IN
HYG Tag = 100

Peak Discharge = 38.40 cfs
Time to Peak = 12.1000 hrs
HYG Volume = 4.215 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.5000	.00	.01	.03	.06	.09
1.0000	.12	.15	.17	.19	.21
1.5000	.22	.24	.25	.27	.28
2.0000	.29	.30	.32	.33	.34
2.5000	.36	.37	.38	.39	.41
3.0000	.42	.43	.44	.45	.46
3.5000	.48	.49	.50	.51	.52
4.0000	.53	.54	.55	.56	.57
4.5000	.58	.59	.60	.61	.62
5.0000	.63	.64	.65	.66	.67
5.5000	.68	.69	.70	.71	.71
6.0000	.72	.74	.75	.78	.80
6.5000	.83	.85	.88	.90	.93
7.0000	.95	.98	1.00	1.03	1.06
7.5000	1.08	1.11	1.13	1.16	1.18
8.0000	1.21	1.24	1.29	1.34	1.39
8.5000	1.45	1.51	1.57	1.62	1.68
9.0000	1.74	1.79	1.85	1.91	1.97
9.5000	2.03	2.08	2.14	2.20	2.26
10.0000	2.31	2.39	2.48	2.59	2.71
10.5000	2.82	2.94	3.06	3.18	3.30
11.0000	3.42	3.62	3.94	4.34	4.78
11.5000	5.23	6.55	9.40	13.13	17.40
12.0000	29.69	38.40	32.26	24.72	18.67
12.5000	13.26	9.28	7.13	6.00	5.28
13.0000	4.72	4.29	4.02	3.84	3.70
13.5000	3.56	3.43	3.30	3.17	3.04
14.0000	2.91	2.80	2.71	2.64	2.57
14.5000	2.51	2.45	2.38	2.32	2.26
15.0000	2.19	2.13	2.07	2.00	1.94
15.5000	1.88	1.81	1.75	1.69	1.62

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
16.0000	1.56	1.50	1.46	1.43	1.40
16.5000	1.37	1.34	1.31	1.29	1.26
17.0000	1.23	1.20	1.17	1.15	1.12
17.5000	1.09	1.06	1.03	1.00	.98
18.0000	.95	.92	.91	.90	.89
18.5000	.88	.87	.86	.86	.85
19.0000	.84	.83	.82	.81	.81
19.5000	.80	.79	.78	.77	.76
20.0000	.76	.75	.74	.73	.73
20.5000	.72	.72	.71	.70	.69
21.0000	.69	.68	.68	.67	.66
21.5000	.66	.65	.64	.64	.63
22.0000	.63	.62	.61	.61	.60
22.5000	.59	.59	.58	.57	.57
23.0000	.56	.55	.55	.54	.54
23.5000	.53	.52	.52	.51	.50
24.0000	.50	.25	.10	.04	.01
24.5000	.00	.00			

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 4 IN  1
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 1

Pond Node   Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    65.25 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     13.95 cfs    at    1.1000 hrs
Peak Outflow      =      9.39 cfs    at    1.2000 hrs
-----------------------------------------------------
Peak Elevation    =     68.08 ft
Peak Storage =            .233 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .513
- Infiltration =        .000
- HYG Vol OUT  =        .362
- Retained Vol =        .151
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 4 IN  2
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 2

Pond Node   Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    65.25 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     14.27 cfs    at   12.1000 hrs
Peak Outflow      =     12.90 cfs    at   12.2000 hrs
-----------------------------------------------------
Peak Elevation    =     68.28 ft
Peak Storage =           .254 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.513
- Infiltration =        .000
- HYG Vol OUT  =       1.362
- Retained Vol =        .151
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

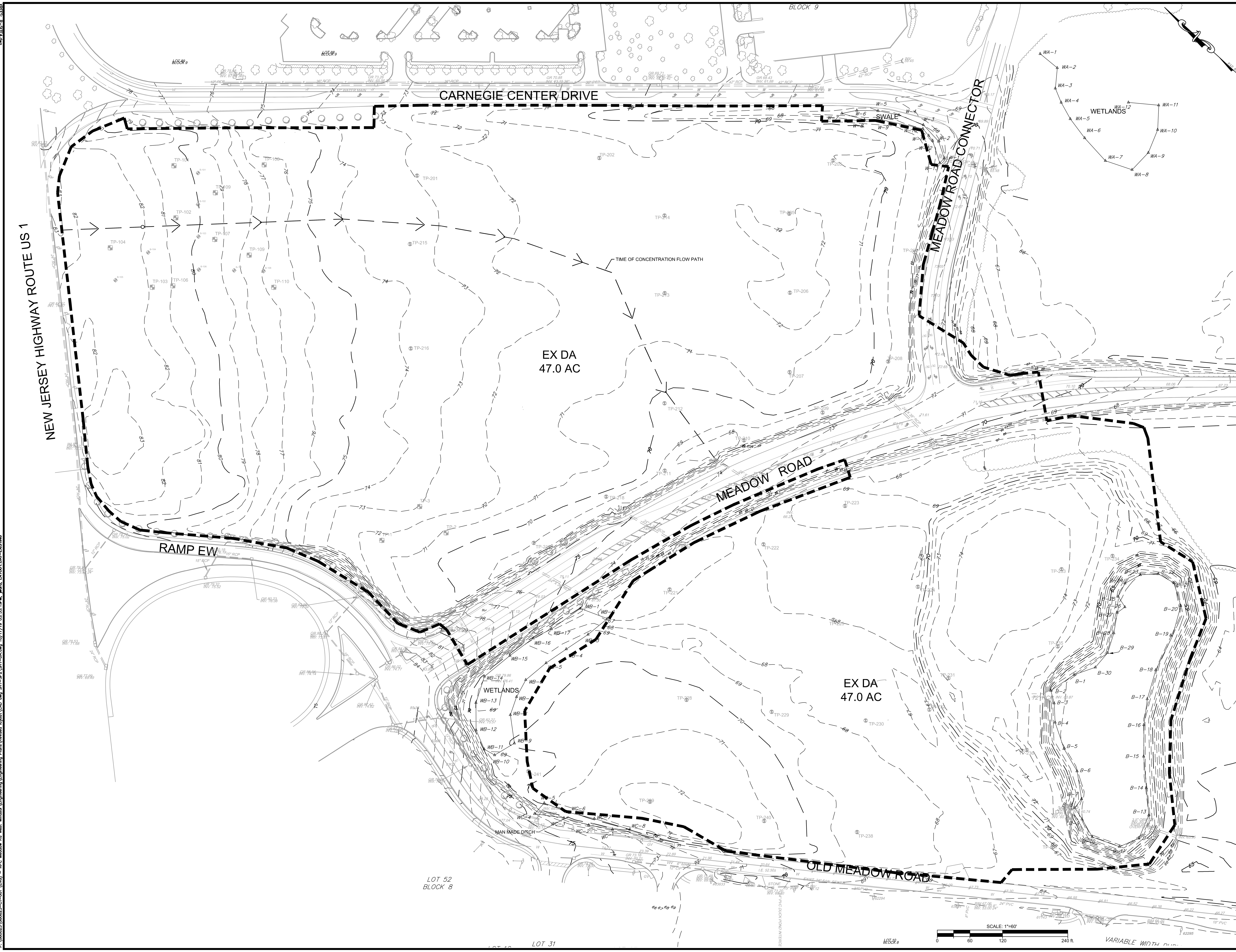
```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 4 IN  10
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 10

Pond Node   Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    65.25 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     21.75 cfs    at   12.1000 hrs
Peak Outflow      =     20.20 cfs    at   12.2000 hrs
-----------------------------------------------------
Peak Elevation    =     68.59 ft
Peak Storage =           .290 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       2.384
- Infiltration =        .000
- HYG Vol OUT  =       2.233
- Retained Vol =        .151
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = P:\080823\080823-C1-001 (ENG) - RPC Meadow Rd West Windsor\Admin\Repor
Inflow  HYG file = NONE STORED - BASIN PROP 4 IN  100
Outflow HYG file = NONE STORED - BASIN PROP 4 OUT 100

Pond Node   Data = BASIN PROP 4
Pond Volume Data = BASIN PROP 4
Pond Outlet Data = Outlet 4

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    65.25 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     38.40 cfs    at   12.1000 hrs
Peak Outflow      =     36.96 cfs    at   12.1000 hrs
-----------------------------------------------------
Peak Elevation    =     68.93 ft
Peak Storage =           .330 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       4.215
- Infiltration =        .000
- HYG Vol OUT  =       4.064
- Retained Vol =        .151
                  ----------
  Unrouted Vol =        .000 ac-ft  (.000% of Inflow Volume)
```

Index of Starting Page Numbers for ID Names

APPENDIX NO. 4
DRAINAGE AREA MAPS



PRELIMINARY AND FINAL SUBDIVISION & PRELIMINARY & FINAL SITE PLAN FOR
PROPOSED HOTEL & RESTAURANT
PRELIMINARY MAJOR SITE PLAN FOR
PROPOSED RESIDENTIAL DEVELOPMENT
PRINCETON EXECUTIVE PARK

EXISTING DRAINAGE AREA MAP

BLOCK 9, LOTS 12.01, and 12.02, BLOCK 9.03, LOT 12.02
TOWNSHIP OF WEST WINDSOR, MERCER COUNTY, NEW JERSEY

Bowman Consulting Group, Ltd.
303 W. Main Street
Freehold, New Jersey 07728
www.bowmanconsulting.com
E-mail: NJ@BowmanConsulting.com
Phone: 732-665-5500
FAX: 732-665-5501
NJ Certificate of Authorization
No. 24GA28222600
R. MICHAEL MCKENNA, N.J. Professional Engineer Lic. 24GE02590400

PROJ.: 080823-C1-001
DATE: 5/17/19
CHKD: .

	REVISION	DATE	CHKD
1	GENERAL REVISION AS PER TOWNSHIP REVIEW	10/18/19	
2			
3			
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6			
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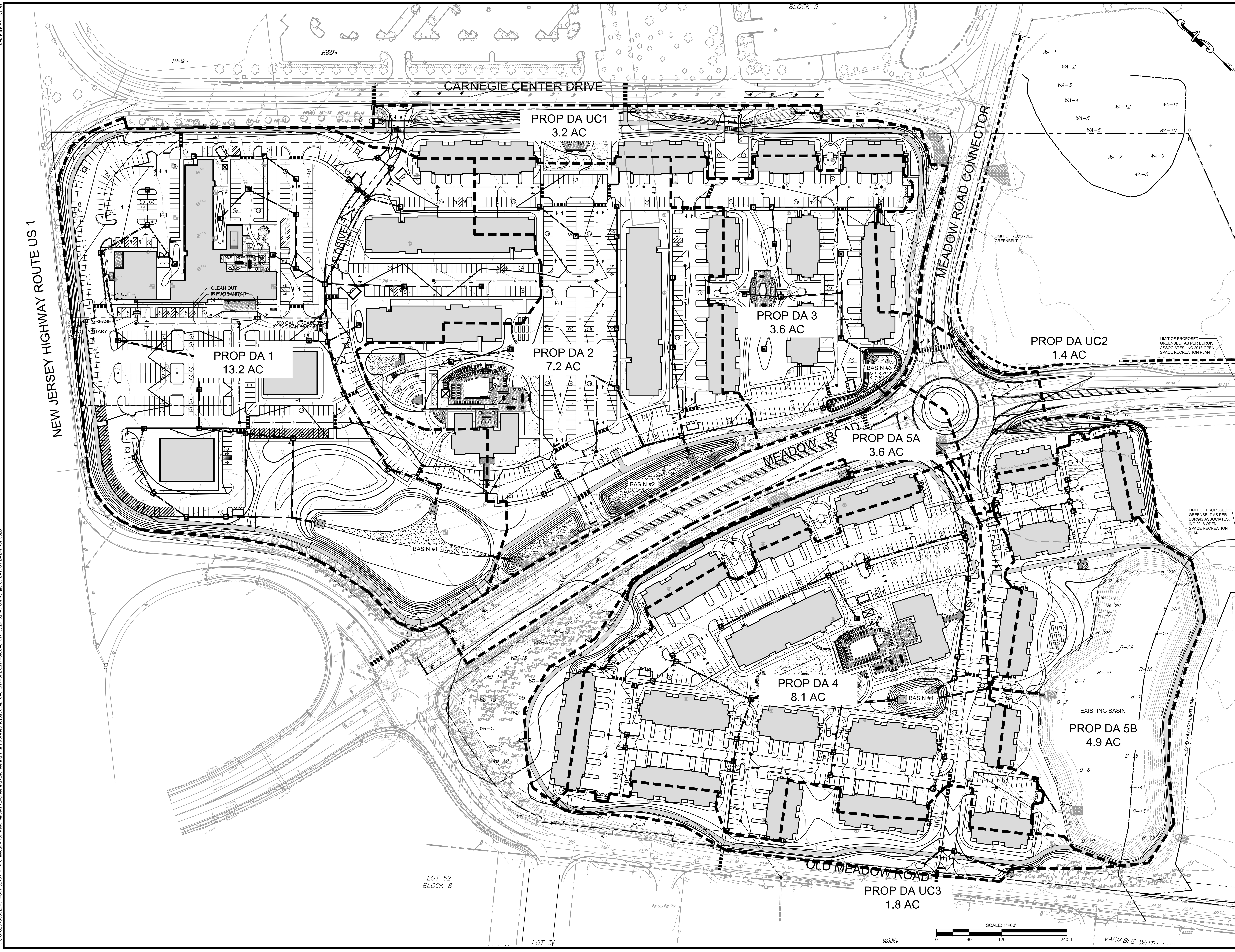
10			
11			
12			

SHEET No.
1
OF



12			
11			
10			
9			
8			
7			
	REVISION	DATE	CHKD

6			
5			
4			
3			
2	GENERAL REVISIONS	1/15/20	
1	ISSUED TO CLIENT FOR REVIEW AND COMMENT	1/7/20	
	REVISION	DATE	CHKD

PROJ.: 080823-C1-001
DATE: 5/17/19
CHKD:

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NJ Certificate of Authorization No. 24GA28222600

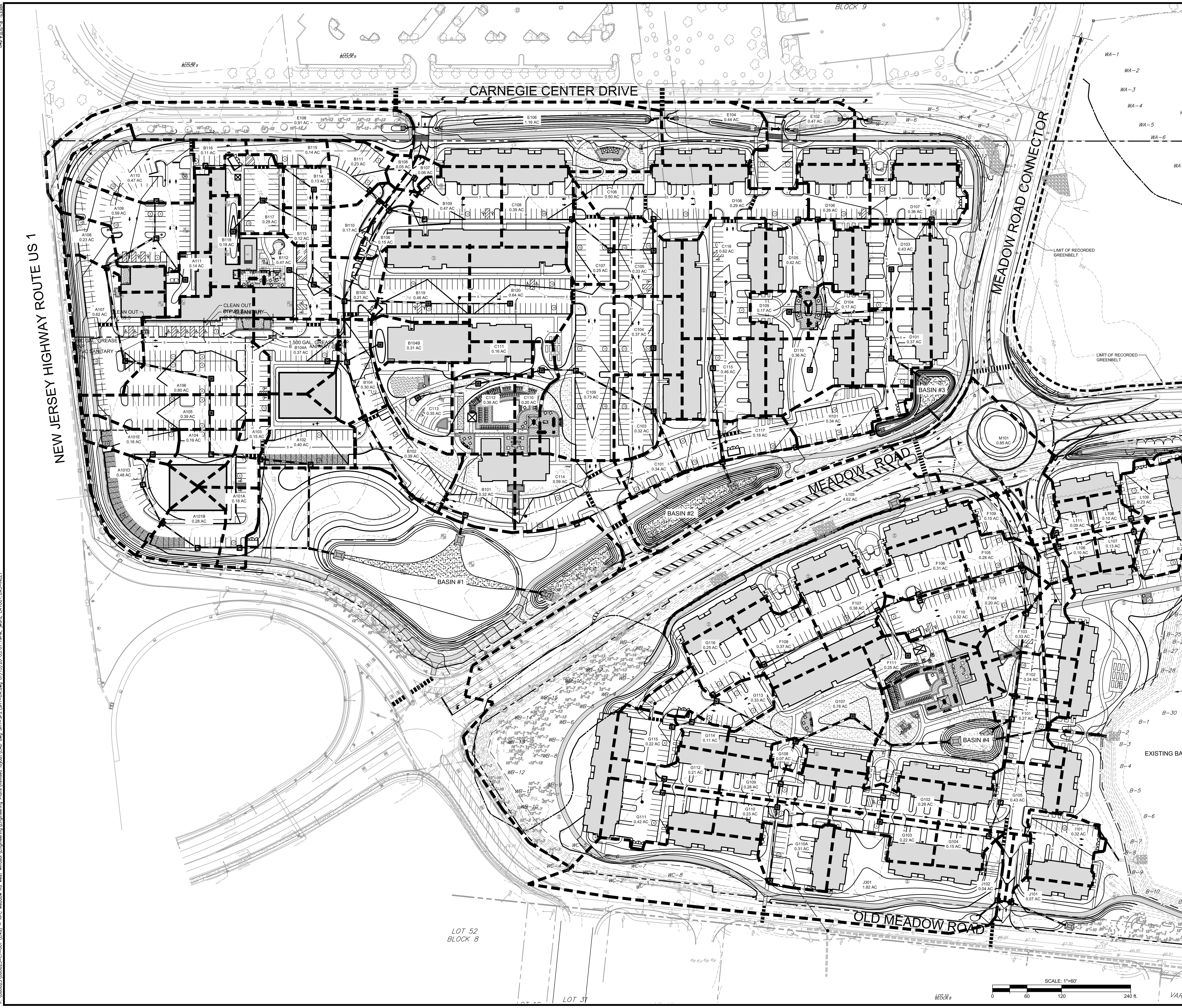
R. MICHAEL MCKENNA, N.J. Professional Engineer Lic. 24GE02590400

PRELIMINARY AND FINAL SUBDIVISION & PRELIMINARY & FINAL SITE PLAN FOR
PROPOSED HOTEL & RESTAURANT
PRELIMINARY MAJOR SITE PLAN FOR
PROPOSED RESIDENTIAL DEVELOPMENT
PRINCETON EXECUTIVE PARK

PROPOSED DRAINAGE AREA MAP

BLOCK 9, LOTS 12.01, and 12.02, BLOCK 9.03, LOT 12.02
TOWNSHIP OF WEST WINDSOR, MERCER COUNTY, NEW JERSEY

SHEET No.
2
OF



2	GENERAL REVISIONS	1/15/20	
1	ISSUED TO CLIENT FOR REVIEW AND COMMENT	1/7/20	
	REVISION	DATE	CHKD

PROJ.: 080823-C1-001
DATE: 5/17/19
CHKD:

Bowman CONSULTING

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R. MICHAEL MCKENNA, N.J. Professional Engineer Lic. 24GE02590400

PRELIMINARY AND FINAL SUBDIVISION & PRELIMINARY & FINAL SITE PLAN FOR
PROPOSED HOTEL & RESTAURANT
PRELIMINARY MAJOR SITE PLAN FOR
PROPOSED RESIDENTIAL DEVELOPMENT
PRINCETON EXECUTIVE PARK

INLET DRAINAGE AREA MAP

BLOCK 9, LOTS 12.01, and 12.02, BLOCK 9.03, LOT 12.02
TOWNSHIP OF WEST WINDSOR, MERCER COUNTY, NEW JERSEY

SHEET No.
3
OF